Programmatic Accessibility Guidelines for National Park Service Interpretive Media

Table of Contents

Prior to the October 2007 edition of these Guidelines, this document was titled *Special Populations: Programmatic Accessibility Guidelines for Interpretive Media*. Note: Because accessibility regulations and technology continue to evolve, we will post updates and corrections on the HFC accessibility website, www.nps.gov/hfc/accessibility.

About These Guidelines

The *Programmatic Accessibility Guidelines for National Park Service Interpretive Media* is for media specialists, interpreters, rangers, superintendents, and other National Park Service employees and contractors who develop and approve interpretive media. Publications, exhibits, audio-visual programs and tours, wayside exhibits, signage, and web-based media provide park visitors with information and context so that their experience of visiting national parks can be both safe and meaningful. Park visitors who have physical, sensory, or cognitive disabilities have legally established civil rights to receive the same information and context that NPS interpretive media products have always provided to their fellow citizens. The following is an excerpt from Section 504 of the *Rehabilitation Act of 1973*, as amended:

> No otherwise qualified handicapped individual in the United States . . . shall, solely by reason of his handicap, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance *or under any program or activity conducted by any Executive agency or by the United States Postal Service*.

Accountability is described in the following two excerpts from *NPS Director's Order #42: Accessibility for Visitors with Disabilities in National Park Service Programs and Services* (November 3, 2000):

> **Superintendents**   Superintendents ensure all of their programs, facilities, and services are accessible, in conformance with applicable laws, regulations, standards and policies. Each superintendent ensures all new programs, facilities and services are designed, constructed and delivered in compliance with accessibility requirements.

> **Harpers Ferry Center**   The HFC is responsible for the overall management and direction of interpretive media . . . throughout the NPS. The HFC works to ensure that the highest level of accessibility that is reasonable is incorporated into all aspects of interpretive media, planning, design and construction. This includes ensuring that all new interpretive media are provided in such a way as to be accessible to and usable by all persons with a disability. It also means all existing practices and procedures are evaluated to determine the degree to which they are currently accessible to all visitors, and modifications are made to assure conformance with applicable laws and regulations.

Federal law and agency policy require the NPS to offer media accessible to a wide range of abilities. How the NPS can provide programmatic access in its interpretive efforts to communicate with people with disabilities is a challenging, complex, and confusing topic. We all need guidance about how to apply regulations, standards, and best practices servicewide.

These NPS Guidelines combine laws, policies, and best practices. They present highlights only; they are not comprehensive. "Appendix A: Laws, Regulations, and Policies" tells where to find the full text of the laws and regulations that NPS decision-makers are responsible for following.

Although we organize the guidelines by media product for ease of use, NPS employees recognize that no interpretive media product works alone. Media products are interdependent and each has inherent strengths and weaknesses. Park visitors sample and benefit from an array of interpretive media.

These Guidelines describe design and presentation solutions that are acceptable in most interpretive media situations. The Guidelines acknowledge that those who create and review interpretive media must be flexible and versatile because park resources and circumstances are so diverse. No document can prescribe solutions for every situation that arises in the National Park System.

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Getting Started

Interpretive Planning

Successful interpretive programmatic accessibility begins with parkwide comprehensive interpretive planning—so that all media can work together. Where one medium may not be accessible to all persons, other media can fill the gaps. Early recognition of, and sensitivity to, accessibility issues will result in the most successful visitor experience.

Interpretive planning develops goal-driven communications strategies to enhance visitor experiences in parks. The basic interpretive planning document is the Long-Range Interpretive Plan (LRIP). Its three parts: 1) Develop overall goals; 2) assess current conditions; and 3) recommend personal services, interpretive media and facilities, and partnership programs.

Although not design documents, LRIPs should provide overall guidance on accessibility strategies and priorities for the park. Existing conditions in the park should be assessed with respect to accessibility for diverse audiences. Recommendations should follow accessibility guidelines and describe a strategy for providing access to essential services, information, and experiences to diverse audiences with different abilities.

Interpretive Planning Guidelines

NPS 2006 Management Policies directs facilities planners to "… incorporate universal design principles to provide for accessibility for all people, including those with disabilities…." See "Appendix C: Principles of Universal Design."

In the earliest stage of any project, all planning shall be guided by Universal Design principles. Most important is Principle One: Equitable Use, where the same experience can be provided for all users, without segregating or stigmatizing others with special accommodations or the need to ask for the special accommodations. Certain basic assumptions shall be made in the planning process:

■ The facility shall be fully accessible to people in wheelchairs.

■ Captioning, audio description, and assistive listening shall be provided for all audiovisual elements.

■ The interpretive media shall be multi-sensory for all the interpretive messages being conveyed.

■ If interpretive media like exhibits or historically furnished rooms are on a floor of a historic building not accessible by people in wheelchairs, programmatic alternatives must be developed for those visitors. See "Appendix D: Alternative Media Formats."

■ Specific accessibility guidelines and standards should be referenced in the document. LRIP documents themselves must be accessible. For information on accessible interpretive plans and reports, see "Publications, Reports."

■ In the planning and design process, installing interpretive media in areas of buildings without wheelchair access is discouraged unless there is a special circumstance makes it essential to the overall interpretive plan.

■ During the early planning and design of interpretive media for a facility, the team needs to analyze the overall programmatic access as well as the site. Planners shall:

Inventory existing interpretive programs that enhance accessibility to people with disabilities.

Evaluate facilities where new media might be installed. What accessibility issues need to be addressed?

Evaluate how the interpretive programs, planned interpretive media, and facilities together could make as accessible a visitor experience as possible. This document needs to provide guidance for all future planning.

■ Consumer involvement: Identify disability organizations and individuals with various disabilities, and include them in the project planning process.

Scoping

■ Use *Architectural Barriers Act Accessibility Standards* (ABAAS) Chapters 1 and 2 (pages 72–140) to determine what interpretive media and facilities are needed: new, old, alterations, temporary, permanent facilities, ratios, minimum requirements, and more.

■ The provisions of ABAAS Technical Chapters 3 through 10 shall apply where required by ABAAS ABA Chapter 2 or where referenced by a requirement elsewhere in ABAAS.

Evaluation

Harpers Ferry Center works with the National Park Service Social Science Program to gather useful knowledge about park visitors and the public. HFC's goal is to acquire a better understanding of audiences, which ultimately helps planners and designers create more effective interpretive media. Another goal is to make media evaluations and evaluation resources accessible to parks and contractors who are working on interpretive media projects throughout the National Park Service. Traditionally, there are three stages during which formal visitor studies, or evaluations, are conducted.

Front-End Evaluation is conducted during the beginning of a project, when themes, story lines, and program ideas are being considered. Front-end evaluation concentrates on getting input from potential visitors by means of interviews and/or focus groups, to find out what kinds of information they need and would like to know, and how this information could be presented in a meaningful, interesting, and cost effective way. Misconceptions about the subject matter are also revealed at this stage, often leading to specific content and presentation elements designed to counter them.

Formative Evaluation is conducted before the fabrication of interpretive media, when mock-up testing can be carried out. Formative evaluation is intended to "catch" design, content, and/or accessibility problems before they become a part of the final interpretive media, when they are often difficult and expensive to fix.

Summative/Remedial Evaluation is conducted after final media production, when the total "package" can be evaluated and final adjustments can be made. In a comprehensive evaluation program, the conduct of summative/remedial studies often reveal problems that were not, or could not be, identified during the earlier stages of development. For example, crowd-flow problems are often revealed only when the actual configuration of all the elements of the exhibition are in place. Similarly, orientation and signage problems become "obvious" at this point, and can often be corrected by relatively minor adjustments to wording and/or placement.

Audiovisual Programs and Tours

Audiovisual products give voice and vision to park interpretive themes. Voices from the past can speak, inaccessible peaks can be climbed, and complex processes can be revealed through this powerful medium. High-definition surround-sound theater presentations, audio and video museum elements, oral history recordings, multi-channel soundscapes, computer interactive programs, audio tours, audio and video podcasts, downloadable files, and interactive web features are all ways that the NPS combines sound with images to inform and inspire.

The NPS has adopted a policy of open captioning, audio description, and assistive listening. Still more work needs to be done. Comparatively few NPS theaters show videos that are audio described, for example. Some technical challenges may make providing captioning, audio description, and assistive listening devices difficult. The bigger challenge is to add these elements at the project's end. Always plan accessibility elements from the beginning, never at the end.

Captioning, audio description, and assistive listening methods shall be identified early in any plan for any audiovisual element intended to be used in a unit of the National Park System. These standards apply even to products given to the NPS by an outside entity. For example, AV programs donated to parks must have captioning, audio description, and assistive listening provided regardless of source. These AV elements must also be maintained so that all parts of the presentation function properly.

Park managers will continue to have the final say on the most appropriate AV solution for providing full programmatic accessibility for AV products used at their sites.

For more information visit www.nps.gov/hfc/products/av-accessibility.htm.

Audiovisual Guidelines: Mobility

■ **Assembly areas** (for example, theater, auditorium, and viewing areas) shall provide wheelchair spaces, companion seats, and designated aisle seats complying with ABAAS F21 and 802. Lawn seating shall comply with ABAAS F221.5

Assembly areas shall be accessible and free of architectural barriers, or alternative accommodations will be provided. See "Exhibits Guidelines: Mobility."

■ **Wheelchair spaces** shall be provided in assembly areas with fixed seating. See ABAAS F221.2 for more details and ratios.

■ **Integration**. Wheelchair spaces shall be an integral part of the seating plan.

■ **Lines of Sight and Dispersion**. Wheelchair spaces shall provide lines of sight complying with ABAAS 802.2 and shall comply with ABAAS F221.2.3. In providing lines of sight, wheelchair spaces shall be dispersed. Wheelchair spaces shall provide spectators with choices of seating locations and viewing angles that are substantially equivalent to, or better than, the choices of seating locations and viewing angles available to all other spectators.
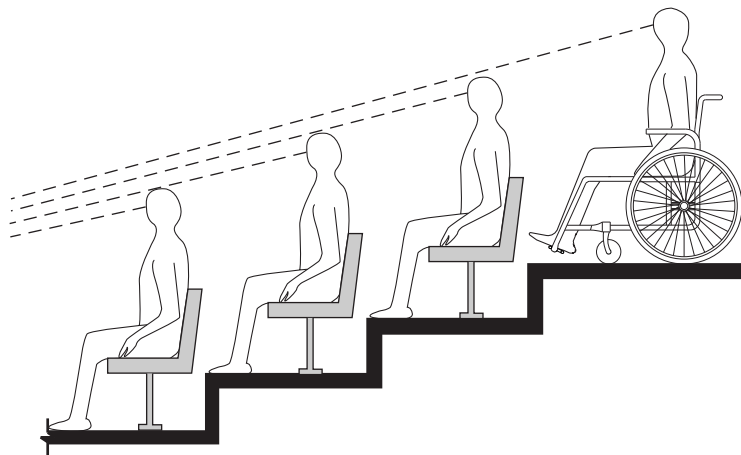
Figure 802.2.1.1
Lines of Sight Over the Heads of Seated Spectators
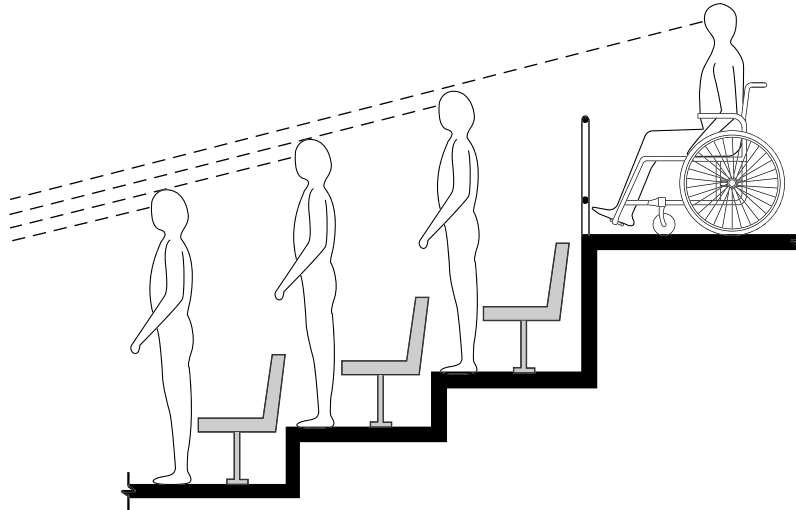
ABAAS Figure 802.2.2.1
Lines of Sight Over the Heads of Standing Spectators

■ **Companion Seats**. At least one companion seat complying with ABAAS 802.3 shall be provided for each wheelchair space required by ABAAS F221.2.1.

■ **Operable Parts**. For designing video, interactive components, and control mechanisms see "Exhibits Guidelines: Mobility."

■ **Non-fixed seating**. The above wheelchair guidelines relate to fixed-seating. For more on non-fixed seating, see "Exhibits Guidlines: Mobility."

Audiovisual Guidelines: Visual

Audio description

Simultaneous audio description shall be provided. Audio description describes the visual content of video or multimedia programs. It provides individuals who are visually impaired with information that further describes the visual content not provided in the primary audio track. Audio description is a separate audio track synchronized with the program's primary audio track. An audio description narrator describes actions, gestures, scene changes, and other visual information. The narrator also describes titles, speaker names, and other text that may appear on the screen. Audio description will be carefully scripted and produced by trained professionals.

The audio description is recorded on a separate audio track and is not heard over the main loudspeaker(s). Visitors requesting audio description will typically receive a headset and receiver. The audio description track is then transmitted to the headset via a radio frequency or infrared signal. Only those with headsets will hear the audio description track.

Computer Interactive Programs

For technical requirements, see the *Rehabilitation Act of 1973, as amended*, Section 508.

Audio Description Tours

■ These tours must be audio described. A separate track is recommended.

■ The audio delivery device must have an option for operation that is easy to use, relatively passive, and hands-free so that visitors are able to use their hands to explore, for example, tactile exhibits. Also, some people learn best through touch. The device should not require visual cues, like a numeric system, especially if there is no audio prompt for a numeric selection.

See "Audiovisual Guidelines: Hearing," below.

Audiovisual Guidelines: Hearing

Captions

All audiovisual programs with spoken dialogue shall be captioned, and the captions shall be displayed at all times. Captions display spoken dialogue as printed words on television screens, computer monitors, projection screens, caption boards, and other visual displays. Captions are designed to enable viewers with hearing loss to participate fully when viewing video or multimedia productions. They include information regarding on- and off-screen sound effects like music or laughter. Captions also benefit people learning a foreign language, learning how to read, or watching TV in a noisy area, and people who understand best by processing visual information.

■ **Captions vs. Subtitles:** Captions are typically displayed on-screen as white letters in a black box. Subtitles generally are not displayed within a black box and do not have standardized font requirements. Subtitles are used to translate dialogue into a different language. They

are primarily intended for hearing audiences, while captions are primarily intended for people with hearing loss. Subtitles rarely convey nonverbal sounds like music or sound effects, whereas captions identify speakers and sound effects using text like "phone ringing" or "footsteps" and symbols to indicate other sounds like music.

- **Caption Board vs. On-Screen Captions**. If you do not use a caption board, captions must be displayed on the video monitor or projection screen itself, superimposed over the picture. These are "on-screen" captions.

  HFC recommends the use of caption boards rather than on-screen captions. Caption boards display captions continuously without covering on-screen program material. The correct size and placement of the caption board is essential for proper readability

- **On-screen captions** shall be no more than two lines, and shall be placed on the bottom two lines of the four-line caption space. When images or on-screen titles interfere with caption readability, the caption placement may temporarily switch from the bottom to the top of the screen.

- A **caption board** is a separate LED screen that displays the captions. Caption board sizes vary. The correct size is determined by the size of the room, the size of the screen, and the distance between audience and screen. Caption boards require a caption decoder.

  The caption board should be placed as close to the video screen as possible; screen frame and caption board mounting hardware should be the only limiting factors. It should be placed underneath the main screen. (If the caption board cannot be placed underneath the screen, it can be placed above.)

  The caption board's LED intensity should be set match the intensity of the video image so that neither display overpowers the other.

  On a caption board, captions should be placed on the top two lines of the four-line caption space.

  The size of the caption board is determined by the viewing distance of the furthest viewer from the display. Caption boards with an LED height of .7 inches (Museum Technology CC-1000 or equivalent) can be viewed up to 30 feet. Caption boards with an LED height of 1.2 inches (Museum Technology CC-2000 or equivalent) can be viewed

up to 50 feet. Caption boards with an LED height of 2.1 inches (Translux Datawall or equivalent) can be viewed up to 90 feet.

■ Open vs. Closed Captions

Open captions are displayed automatically as part of the video. Users need not select them; they are permanently superimposed on the image and cannot be turned off.

Closed captions appear on screen only when the viewer (or AV technician) has specified that they appear. Closed captions can be turned on or off with a caption decoder that lets otherwise-hidden data in the television signal show on the user's TV screen or computer monitor. Many newer television models let viewers to toggle captions on or off with ease.

Whether programs are produced with open or closed captions, or captions are displayed on-screen or on a caption board, captions shall be displayed at all times. Captions help us reach an even wider audience—from visitors with very moderate hearing loss to visitors who cannot hear at all. Always displayed, captions help visitors who would otherwise not ask for this accessibility feature. HFC recommends displaying captions at all times on a caption board or on-screen so that visitors who need this help won't have to ask, and park personnel will not have to be trained to turn captions on and off upon request.

■ Caption Specifications

HFC recommends the following caption-production specifications:

Captions shall appear on **no more than two lines**, with no more than 32 characters per line.

Captions shall be **pop-on/pop-off** (vs. roll-up).

Caption boards and on-screen closed captions shall use **all uppercase characters**. (Closed captioning software does not handle lower case letters very well. Any letters with a descender (g, j, p, q, and y) is "pushed up" so that the bottom of the descender is even with the bottom of the other letters, detracting from readabilty.

On-screen open captions shall use **upper- and lower-case** characters.

On-screen open captions scale with the picture. Companies that

produce captions should follow Federal Communications Commission (FCC) regulations to determine caption specifications, including the correct character size, font type, colors, etc. Subtitles should follow FCC open captioned regulations.

On-screen captions shall appear at the **bottom of the screen**.

Captions shall distinguish between **narration and spoken dialogue**.

Captions shall indicate the presence of **music and sound effects**.

■ The Rear Window captioning system may be used in IMAX theaters. Because of the Universal Design principle that all viewers have the same experience and because use of Rear Window requires users to self-identify, this technology should be used as a last resort at non-IMAX theaters.

Scripts

Printed scripts are NOT an alternative to the required open captioning. However, visitors may want to see a verbatim script to prepare for their visit or while at the park. As a standard procedure, copies of scripts shall be provided to parks and shall be available—in standard print size and in large print—to visitors upon request. See "Publications."

Assistive listening

Assistive listening uses various devices that amplify volume for persons with mild to profound hearing loss who may or may not use a hearing aid. Assistive listening devices (ALDs) include headsets, earbuds, and hearing aids. The amplified sound is transmitted via radio frequency, infrared, or induction loops to the user's headset, earbuds, or hearing aid. Assistive listening systems and audio amplification will be provided. (ABAAS ABA F219 thru F219.3)

■ **Audio equipment used individually** by the visitor, like headphones and telephone handsets, must have individual volume controls and be hearing-aid compatible.

■ **Induction Loop systems** use an electromagnetic coil around the room to create a magnetic field. Hearing aid wearers with T-coils receive the sound directly via their hearing aids or cochlear implants

Video without audio

All video programs that contain no audio shall be identified with a label or caption that says "No Audio."

Competing sounds

People with hearing loss often have difficulty understanding the narration in AV programs when the audio levels of the program's sound effects and music are similar to that of the narrator. Levels for sound effects and music should therefore be mixed accordingly.

Audio Tours

These tours shall be integrated into the whole presentation. They should not be the same experience visitors can get from other recordings or websites..

■ Audio guides will be **hands-free** or have a hands-free option so that visitors can use their hands to explore, for example, tactile exhibits.

■ Cell phones are sometimes used as an audio tour delivery system. This can be a problem if visitors have to use their own cell phones. Besides the cost to the user, some people with disabilities rely on cell phones to maintain their independence and must avoid depleting the batteries through nonessential use.

■ When audio guides are available, **neck loops or T-coil compatible** audio guides shall be available and appropriate signage will be posted.

■ **Transcripts** of the audio tour shall be available in standard and large print.

■ **Qualified sign-language interpreters** shall be available for scheduled and/or announced tours and/or upon request with reasonable advance notice.

Audiovisual Guidelines: Cognitive

■ Topics shall be of **general interest**. Avoid unnecessarily complex and confusing concepts.

■ Easy-to-understand **graphic elements** shall be used to convey ideas, in addition to verbal components.

■ **Narration shall be concise** and free of unfamiliar expressions, technical terms, and jargon.

■ The text of the **audio description** shall comply with items above and be presented so that people with varying abilities can understand it. It must be consistent with the other interpretive media in terminology and themes. It should be well organized and focus on a limited number of key points, not confuse the listener with too much information.

■ Maps will use color and other creative approaches to facilitate comprehension.

Conservation (Artifacts)

HFC provides professional conservation services that ensure the long-term preservation of museum objects in national park collections. Preservation and conservation of the important cultural resources of the NPS require expert and highly skilled specialists. At HFC, conservators work meticulously to preserve and restore objects of social and cultural significance. They work on diverse materials ranging from fine and decorative art objects to natural history specimens.

The HFC Conservation staff:

■ **Treat objects** for exhibition and long term storage

■ Participate in the **HFC exhibit program**. See "Exhibits."

■ Perform **collection condition surveys** and conduct preventive care training

■ **Research and analyze** artifact materials and topics related to NPS collections for improved preservation and interpretation

Conservation Guidelines

For information on **accessible conservation planning documents**, see "Publications."

Exhibits

Exhibits are multi-media experiences. Because people learn in many ways, exhibits use diverse techniques to interpret park resources, teach concepts, and stimulate interest. Exhibits tell stories using objects, text, images, multimedia, interactive devices, figures, models, and lighting effects. Successful exhibits communicate to the visitor the significance and context of artifacts that the NPS has chosen to collect, conserve, and display.

Visitors are free to move through exhibits at their own pace. They may often interact physically with exhibits and learn by doing. The goal is not only to educate but to inspire. Display items range from tools and weapons to the art of prehistoric and historic American cultures. Webs of life in our natural habitats are shown with plant and animal models. Illustrations complete stories and set them in larger contexts. Art is used to reconstruct early events for which no visual material exists.

Exhibits sometimes must be put in places ill-suited to their purpose. Pre-existing architectural structure or décor may limit many exhibit design decisions. Because the situations encountered in NPS exhibit spaces are so diverse, thoughtful, sensitive design can go a long way to produce NPS exhibits that can be enjoyed by a broad range of people.

Exhibits Guidelines: Mobility

Floors or Ground Surfaces

(See ABAAS 302 for details.)

■ Floors and ground surfaces shall be **stable, level, firm, and slip-resistant**.

■ **Carpet or carpet tile** shall be securely attached and shall comply with ABAAS 302.2 "Carpet." Exposed edges of carpet shall be fastened to floor surfaces and shall have trim on the entire length of the exposed edge. Carpet edge trim shall comply with ABAAS 303, "Changes in Level."
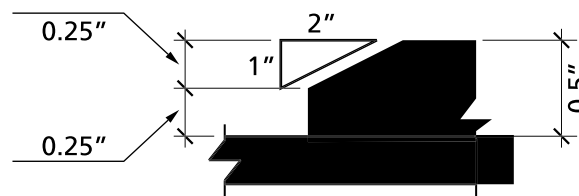
0.5" max
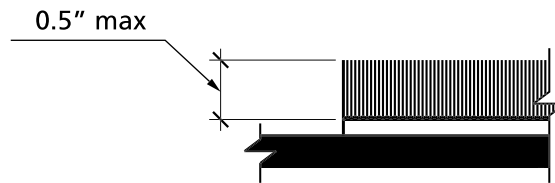
**ABAAS Figure 302.2
Carpet Pile Height**

■ **Changes in level:**
(See ABAAS 303 for details.)

Vertical. Changes in level of ¼ inch high maximum shall be permitted to be vertical.

**Beveled**. Changes in level between ¼ inch and ½ inch shall be beveled with a slope not steeper than 1:2. See also ABAAS advisory 303.3.

0.25"
2"
1"
0.5"
0.25"

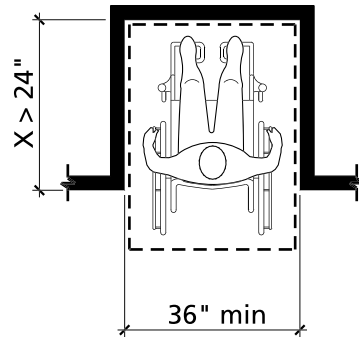**ABAAS Figure 303.3
Beveled Change in Level**

Ramps. Changes in level greater than ½ inch high shall be ramped, and shall comply with ABAAS 405. In most cases ramps shall be as gradual as possible and not exceed a 1-inch rise in 12-inch run.

■ **Position:** Unless otherwise specified, clear floor or ground space shall be positioned for either forward or parallel approach to an element.
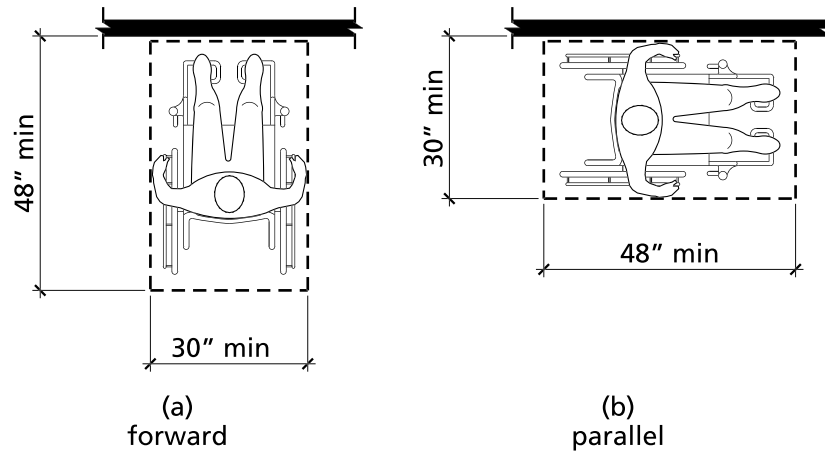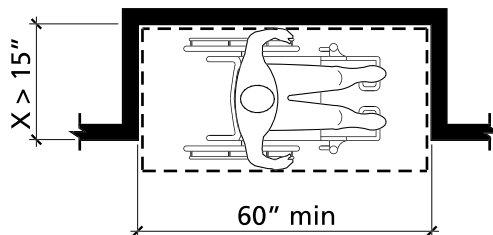

ABAAS Figure 305.5
Position of Clear Floor or Ground Space

■ **Maneuvering Clearance.** Where a clear floor or ground space is located in an alcove or otherwise confined on all or part of three sides, additional maneuvering clearance shall be provided in accordance with ABAAS 305.7.1 and 305.7.2.

ABAAS Figure 305.7.1
Maneuvering Clearance in an Alcove,
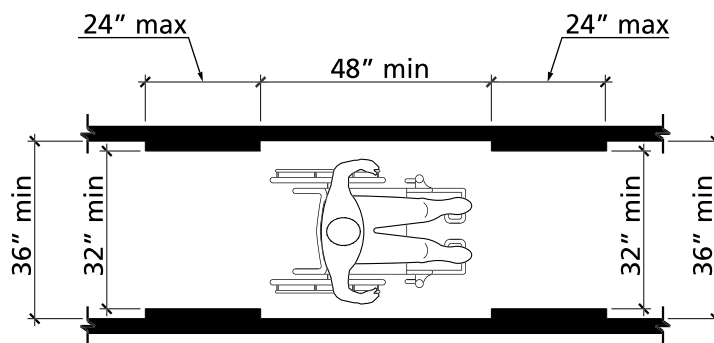**Forward Approach**

ABAAS Figure 305.7.2
Maneuvering Clearance in an Alcove,
Parallel Approach

Circulation Space

■ **General:** Circulation through the exhibit space shall meet the requirements of an accessible route as described in ABAAS, Chapter 4, "Accessible Routes."

The exhibit space should be free of architectural barriers. If, for example, an exhibit is in an inaccessible area of an historic structure, at least one method of alternative accommodations shall be provided. If the inaccessible space is of crucial interpretive significance to the site, at least two alternative methods of accommodation shall be provided. See "Appendix D: Alternative Media Formats."

■ **Passageways** through exhibits shall be at least 36 inches wide to provide adequate clearance for wheelchairs.

Figure 403.5.1
Clear Width of an Accessible Route

■ **Turning space:** If an exhibit passageway reaches a dead-end, a turning space shall be provided by either a T-shaped turning space which complies with ABAAS Figure 304.3.2 or a circular space of 60 inches diameter minimum. The space shall be permitted to include knee and toe clearance complying with ABAAS 306.

ABAAS Figure 304.3.2
T-Shaped Turning Space

Protruding Objects
(See ABAAS 307.)

- **Objects projecting from walls** with their leading edges between 27 inches and 80 inches above the floor shall protrude no more than 4 inches in passageways or aisles. Objects projecting from walls with their leading edges at or below 27 inches above the floor can protrude any amount. (See ABAAS Figure 307.2 below.)

4" max

X > 27"

X ≥ 80"
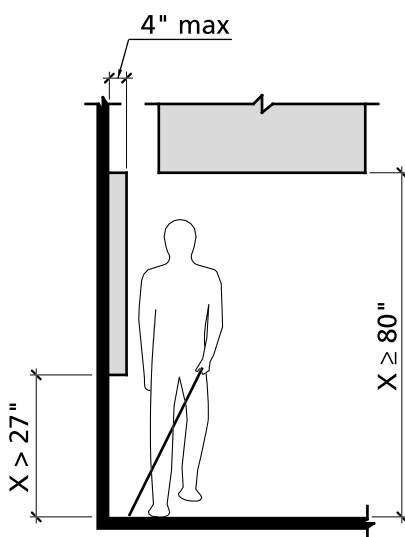
**ABAAS Figure 307.2
Limits of Protruding Objects**

■ **Post-Mounted Objects**: Free-standing objects mounted on posts or pylons will overhang a maximum of 12 inches from 27 inches to 80 inches above the floor. (See ABAAS Figure 307.3 below.)
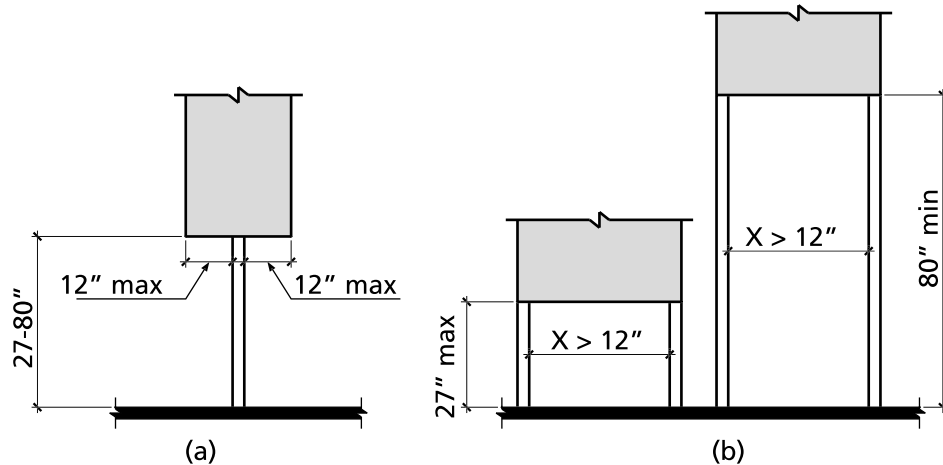
ABAAS Figure 307.3
Post-Mounted Protruding Objects

■ **Passageways** or other circulation spaces shall have a minimum clear headroom of 80 inches. For example, signage hanging from the ceiling must have at least 80 inches from the floor to the bottom edge of the sign. (See ABAAS Figure 307.2 above.)
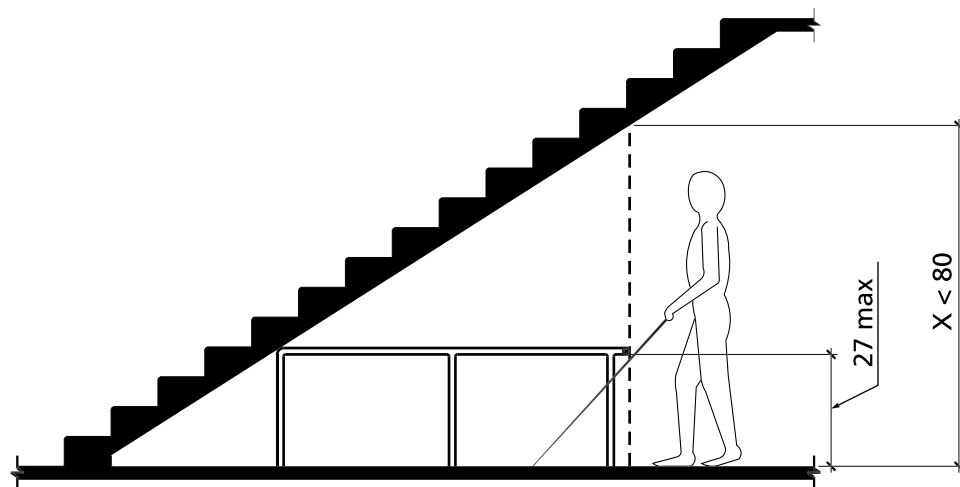
ABAAS Figure 307.4
Vertical Clearance

■ Protruding objects shall not reduce the clear width required for accessible routes (See ABAAS 307.5.)

■ When a horizontal exhibit element is located on a platform, table, pedestal, or otherwise surrounded by a railing over which visitors will lean, a vertical clearance of minimum of 80 inches minimum shall be maintained up to 36 inches inward from the railing.

Artifact Cases

■ Maximum height of floor of artifact case display area shall be no higher than 30 inches from the floor of the room. This includes vitrines that are recessed into an exhibit wall.

■ **Artifact labels** on a vertical surface shall comply with Character Height above. Artifact labels on a horizontal surface shall be mounted at an angle to maximize their visibility to all viewers.

■ **Transitions between glazing and framework** of artifact cases or glass doors which surround exhibits or artifacts shall be placed in the visitor's line of sight and not hidden behind railings, platforms, or other exhibit structures. This is so that the glazing is immediately visible to the visitor, and the visitor does not mistakenly think he or she can lean into the opening for a closer look.

■ Angled tables are more accessible to wheelchair users.

Touchable Exhibits:

■ **Reach Ranges**: See ABAAS 308 for more details, including children's reach ranges, obstructed/unobstructed reaches and exceptions. HFC uses the common reach ranges of adults and children ages 9 and above for forward and side unobstructed reaches.

■ **Forward Reach** (unobstructed): For touchable exhibits positioned unobstructed on a vertical surface, the high forward reach will be 44 inches maximum, and the low forward reach will be 16 inches minimum above the finished floor. These are common measurements for adults and children ages 9 and above. (See figure 308.2.1.)
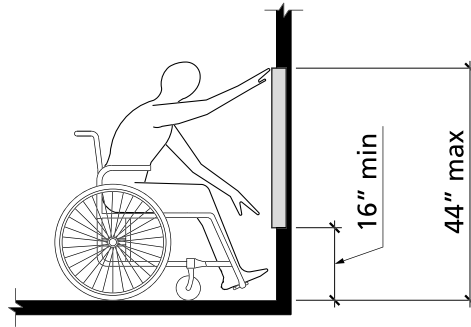
HFC modified ABAAS Figure 308.2.1
accessible to adults and children ages 9 and over
Unobstructed Forward Reach

(a)

(b)
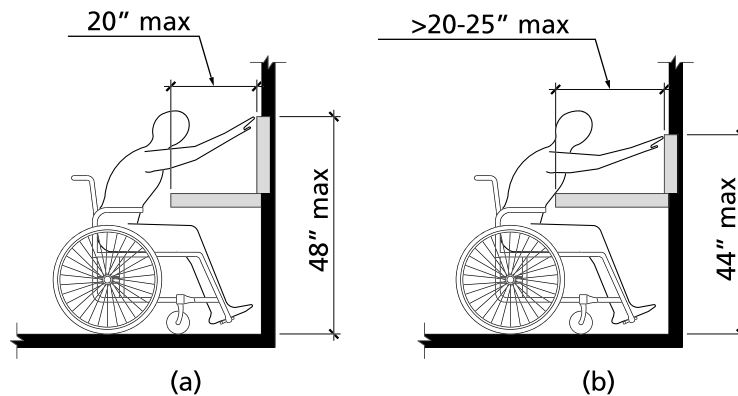
ABAAS Figure 308.2.2
Obstructed High Forward Reach

■ **Side Reach (unobstructed):** Where a clear floor space allows a parallel approach to a touchable exhibits and the side reach is unobstructed, the high side reach will be 44 inches maximum, and the low side reach shall be 16 inches minimum above the finished floor. These are common measurements for adults and children ages 9 and above. (See modified ABAAS figre 308.3.1.)
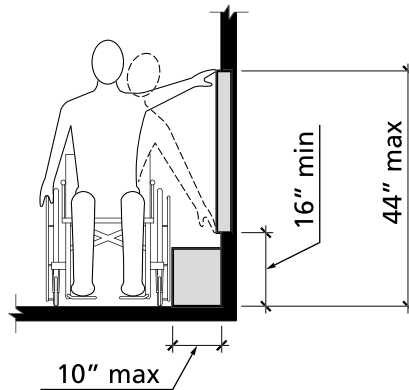

HFC modified ABAAS Figure 308.3.1
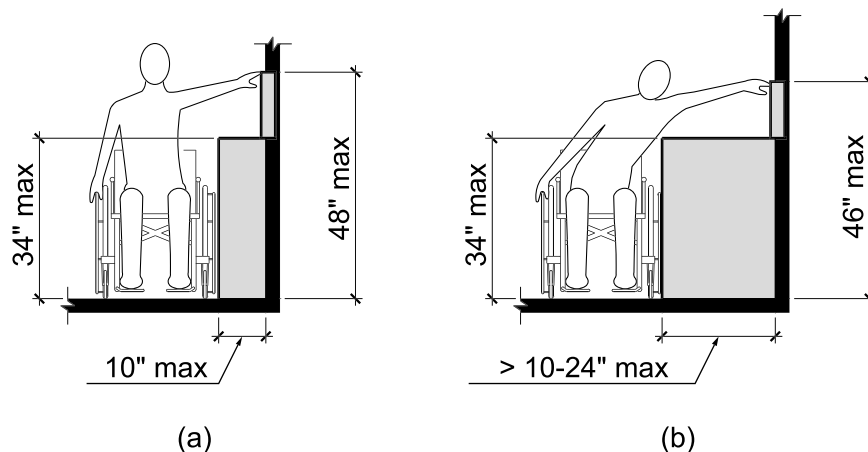accessible to adults and children ages 9 and over
Unobstructed Side Reach

(a)

(b)

ABAAS Figure 308.3.2
Obstructed High Side Reach

■ **Operable Parts:** See "Operable Parts of Interactive Exhibits" below.

Railings and barriers

■ **Vertical Protective Barriers:** Vertical barriers to protect artifacts, models, multi-media presentations, or other exhibit elements, which are intended to be viewed but not touched by visitors, shall have a maximum height of 36 inches from the floor. The barrier shall be constructed in to provide unobstructed viewing over the barrier by persons in wheelchairs.

■ **Reader Rails:** Railings or barriers which are also the structural support for angled interpretive panels which may include text, graphics, touchable models, interactive exhibits and audiovisual elements are called reader rails. Reader rail panels shall have a maximum height of 30 inches from the floor to the front bottom edge of the panel. The angle of the panel should be 30 degrees. Reader rail panels shall meet the requirements for Protruding Objects under ABAAS 307.2.

Information Desks and Work Surfaces

Information desks and sales counters shall include a section made to accommodate both a visitor in a wheelchair and an employee in a wheelchair working on the other side. A section of the desk/counter shall have the dimensions specified below.

■ The **surface** shall be 28 inches minimum and 34 inches maximum above the finished floor. (See ABAAS 804.3.2.)

■ **Knee clearance space**: (See "Seating" below.)

■ **Width of top surface of section**: at least 36 inches. Additional space must be provided for any equipment like a cash register.

■ **Area underneath and behind desk**: Since both sides of the desk may have to accommodate a wheelchair, this area should be open all the way through to the other side. There shall be no sharp or abrasive surfaces under the work surface desk. (See ABAAS 804.3.3.)

The floor space behind the counter shall be free of obstructions. The finished floor treatment extends underneath the desk.

■ **Work surfaces** shall be between 28 and 34 inches in height above the finished floor. Ideally, this will accommodate the needs of both children six years and older and adults. (See ABAAS 902).

Seating—Interactive Stations/Work Areas

■ **Toe Clearance:**
(See ABAAS Figure 306.2 below. See ABAAS 306.2 for the complete requirements.)

9″

30″ min

6″ max

17-25″

(a)
elevation

(b)
plan
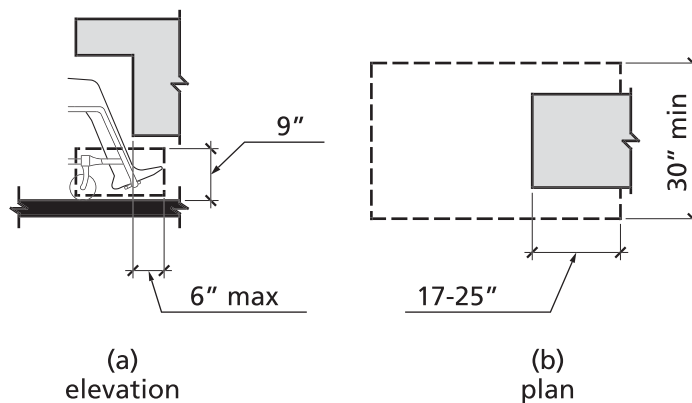
ABAAS Figure 306.2
Toe Clearance

■ **Knee Clearance:**

See ABAAS 306.3 for the complete requirements.

The knee space underneath a work desk shall be:

27 inches minimum above the finished floor.

25 inches maximum in depth.

30 inches wide minimum.

Provide a clear floor space of at least 30 inches by 48 inches in front.
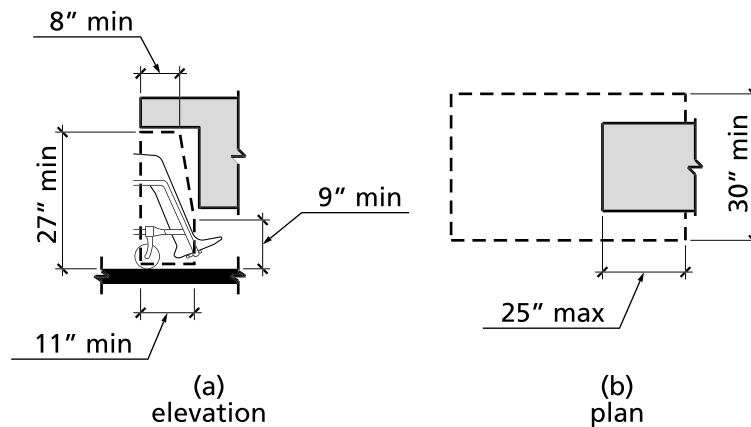
ABAAS Figure 306.3
Knee Clearance

Mini-theaters within a museum exhibit area

When the exhibit incorporates a short multimedia presentation, like a video, in a mini-theater with bench seating (see ABAAS 903.3 and 903.6 for information), space shall be provided for at least one visitor in a wheelchair.

■ **The wheelchair space width** shall be 36 inches wide minimum.

36″ min   33″ min   33″ min

(a)
single space

(b)
two spaces
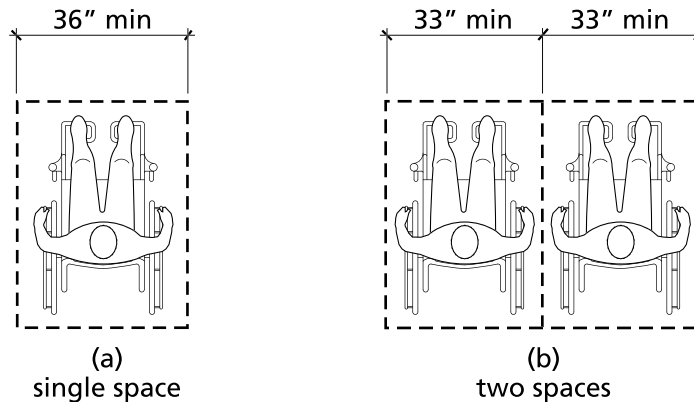
ABAAS Figure 802.1.2
Width of Wheelchair Spaces

■ **The wheelchair space depth:** Where a wheelchair space can be entered from the front or rear, the wheelchair space shall be 48 inches deep minimum. Where a wheelchair space can be entered only from the side, the wheelchair space shall be 60 inches deep minimum.

48″ min   60″ min

(a)
front or rear
entry

(b)
side
entry
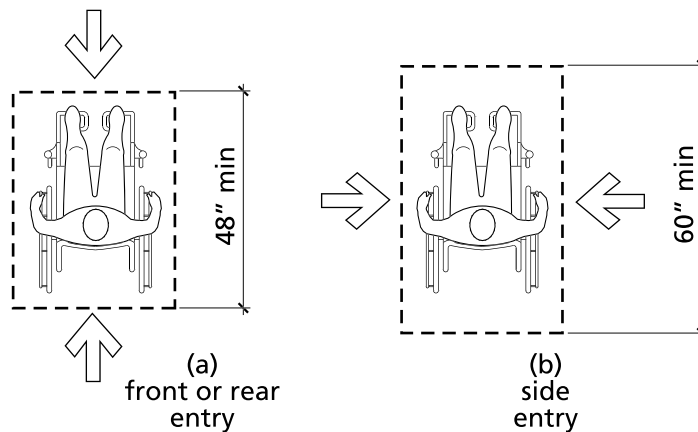
ABAAS Figure 802.1.3
Depth of Wheelchair Spaces

■ **Unobstructed view:** The wheelchair space shall be located so as to provide an unobstructed view of the multimedia presentation.

- ■ **Overlap:** Wheelchair spaces shall not overlap circulation paths.

- ■ **Non-Fixed Seating:** If seating in a mini-theater is in the form of benches, at least one seat with back and arm support shall be provided. This support is essential for people who have mobility impairments—seat arms and backs offer support points for people lowering into and rising out of seats.

Operable Parts of Interactive Exhibits:

- ■ **Operable parts** of mechanical interactive exhibits shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate operable parts shall be 5 pounds maximum. (See ABAAS 309.4.)

- ■ **Push buttons** for electrically-activated interactive exhibits or audio-visual programs shall be spaced a minimum of 0.7 inch from the center of one button to the closest edge of the next button. (*Hands-On Architecture, Access Board Research,* Figure 2.2.) Multiple buttons shall be arranged in either vertical or horizontal rows.

- ■ **Height:** Operable parts shall be placed within one or more of the reach ranges specified in ABAAS 308.

Exhibits Guidelines: Visual

Tactile Exhibits

- ■ **Touchable examples:** Tactile models and other touchable exhibit items should be used whenever possible. Examples of touchable exhibit elements include relief maps, scale models, raised images of simple graphics, reproduction objects, and replaceable objects (like natural history or geological specimens, cultural history items, etc.). See "Appendix D: Alternative Media Formats."

- ■ **Hands-on living history areas** are helpful to visitors with visual impairments. These areas allow visitors to interact with props, reproductions, and interpreters.

- ■ **Placement** of touchable, tactile models shall be according to "Exhibits Guidelines: Mobility, Touchable Exhibits."

- ■ **Identify the object** and communicate to visitors that the object is meant to be touched.

■ **Production of Tactile Models:**

The model shall be of a **material** that is comfortable to touch, resistant to wear, and finished with a coating that allows for routine cleaning.

No applied or glued elements shall be used on the model. The model shall be cast, carved, or CNC (Computer Numerical Control) routed as one piece.

Colors and images shall be incorporated into the material, spray-applied, or ink-jet printed. No brush-painted details or self-adhesive vinyl decals or type shall be used.

Variety in textures shall be used to differentiate between features on the model like differences in vegetation on a topographic landscape.

Details of the model shall be of an **appropriate scale** to be discernable by finger touch.

The **overall size** of the tactile model shall not be in violation of the allowable reach ranges under ABAAS 308 so that users can touch all areas of the model. Also, if the model is too large to reach all areas with both hands from the same position, it is more difficult to comprehend by touch.

Exterior Tactile Models: Do not use metal for models placed where there will be temperature extremes. If models are placed in uncovered exterior areas, allow for drainage from the model surface to prevent puddles and ice formation.

Computer Interactive Programs

See Section 508 of the *Rehabilitation Act of 1973,* as amended, for technical requirements.

Typography

Making fonts accessible is more than choosing the right font. It is also using the font properly: size, leading, tracking, color, lighting, contrast, etc. Readability of exhibit labels by visitors with various degrees of visual impairment shall follow these guidelines. If one attribute is reduced—for example, lighting—then other attributes must be increased to compensate for legibility, like increasing the point size and/or contrast.

■ **Type size**: While a 24-point minimum type size is a general rule for exhibit text viewed at eye level, readability also depends on viewing distance. A person with low vision who can read large-print publications would have to be very close to a 24-point exhibit label. Also, while a 24-point font might be accessible to visitors with low vision, its location and lighting may not meet the needs of the visitor with low vision.

Accessible Type by Probable Viewing Distance

Probable viewing distance	Interpretative exhibits minimum type size (Helvetica Regular)	
	X-height mm (in)	Set size (point)
Less than 75 mm (3 in)	4.5 (3/16)	24
1 m (39 in)	9 (3/8)	48
2 m (78 in)	19 (3/4)	100
3 m (118 in)	28 (1-1/8)	148

Courtesy Parks Canada,
Design Guidelines for Media Accessibility

■ **Typeface:** Use the most readable typefaces wherever possible, particularly for body copy. Accessible fonts do not have varied stroke widths. Some examples: Arial, Century, Frutiger, Helvetica, NPS Rawlinson, and Univers.

■ **Type style and spacing:**

Text set in both **caps and lower case** shall be used in most cases, particularly for body copy.

Letter and word spacing shall be adjusted for maximum readability.

Avoid **overuse of italic** type.

Special effects, such as drop shadows, are acceptable for large display type but not for secondary text or body copy

■ **Type layout:**

Limit body copy **line length** to no more than 45 to 50 characters per line.

Each unit of **body copy** should have no more than 45 to 60 words.

Flush left, rag right text alignment is easiest to read and should be used in most cases.

■ **Eye level zone:** The smallest type in an vertical exhibit panel should be placed within a zone containing the range of eye level for a person in a wheelchair to a standing adult for a panel that must be approachable, with no physical barriers. This eye-level zone is approximately 40 inches to 60 inches from the floor. Adjustments would have to be made based on lighting conditions, colors, contrasts, layouts, and other design considerations. This typically applies to the body copy and photo caption type. If type cannot be placed at the appropriate eye level, increase readability with a larger type size, or more contrasting color and background.

■ **Text behind barriers:** Some exhibit text panels are inside artifact cases, behind barriers, or otherwise placed so that the visitor cannot approach closely to the panel or are impeded by reflecting glass surfaces between the visitor and the text. For these kind of text panels, the type sizes and color-background contrasts shall be increased to maximize readability. Text labels in artifact cases shall be mounted on panels which are placed and angled for maximum readability by a range of people, including people in wheelchairs.

For more information on typography, see "Publications."

Color and Contrast

■ The contrast between the type and the background (either solid tone or image) should be a minimum of 70 percent. For an explanation, see "Publications: Visual, Contrast."

■ Do not use red on green or green on red as the type/backgound color combination. The largest percentage of people who have color-blindness are unable to distinguish these two colors. See "Publications: Visual. Color."

■ The use of graphics behind exhibit text can interfere with readability. Make sure that text is readable against the background image.

Contracted (Grade 2) Braille:

■ Do not position Braille text below waist height, unless it is intended for children.

For more information, see "Publications: Visual."

Samples

■ During the design process, have samples made for review that show font size, typeface, color, and text/background combinations and labels, including Braille, in the exhibit.

Exhibit Lighting

For people with low vision, adequate lighting is essential.

■ **Provide** sufficient, even light for exhibit text. Exhibit text in areas where light levels have been reduced for conservation purposes should have no less than 10 foot-candles (fc) of illumination, with a working usable range of between 10-30 fc.

■ **Avoid harsh reflections and glare**. Consider the effect of glare on exhibit text as viewed from a wheelchair. Avoid high-gloss floor finishes, which can create glare.

- **The lighting system** shall be flexible enough to allow adjustments on-site.

- **Transitions** between the floor and walls, columns or other structures, especially protruding objects and overhead structures, shall be made clearly visible. Finishes for vertical surfaces shall contrast clearly with the floor finish. Floor circulation routes shall have a minimum of 10 foot-candles of illumination.

- **Detail lights** (for exhibits) and **navigational lights** (for the building) lights must be coordinated to eliminate shadows, especially on text. Shadows may inadvertently be created by nearby objects, portions of exhibit cases, or the viewer's own body.

- **Windows** will be treated with film to provide balanced light levels and minimize glare.

- **Avoid backlighting** type or illustrations that have a light background. Backlit text panels or cases should not be placed in front of windows or bright lights.

Accessible Lighting Levels

	Lux (lx)	foot-candles (fc)
Ambient lighting	50–300 lx	4.65–27.9 fc
Text Panels	100–300 lx	9.3–27.9 fc
Controls	100 lx	9.3 fc
Directional signage	200–300 lx	18.6–27.9 fc
Specimens, objects	100–300 lx	9.3–27.9 fc
Ramps, stairs	100–300 lx	9.3–27.9 fc
Visitor pathways	100–300 lx	9.3–27.9 fc

Courtesy Parks Canada,
Design Guidelines for Media Accessibility

Audio Description

Audio description of the museum exhibit as a whole is strongly encouraged and, in many instances, may be required to comply with Section 504 of the *Rehabilitation Act of 1973*, as amended. For more information, see Appendix A: Laws, Regulations, and Policies." Frequently, audio description has been used to provide accessibility to exhibits rather than to make the exhibits themselves accessible. Audio description in general, and audio guidance in particular, is only one of many ways to make exhibits accessible. It is is not the only solution to consider when planning, designing, and producing accessible exhibits. Audio description should be used for both accessible and inaccessible components of exhibits.

■ **Tell the story** as already described in the exhibit text and images visually, in a form adapted to the audio media and its consequent time limitations.

- **Describe and identify** the artifacts, models, and other objects on display in cases that cannot be touched by visitors.

- **Provide instructions and interpretive information** to enhance the visitor's experience while using tactile models or interactive exhibits.

- **Provide audio description** of video programs used in the exhibits.

- Audio description is particularly needed to orient people exploring tactile maps, models, and objects.

For more information, see "Audiovisual Guidelines: Visual."

Exhibits Guidelines: Hearing

Audio components of exhibits may include products like excerpts from oral histories, visitor-selected sound effects of wildlife, and/or ambient sound that fills the entire room. These components shall accommodate people who are deaf by providing either captions or some form of printed alternatives. They shall also accommodate people who are hard of hearing.

- Audio components of exhibits shall be **hearing aid compatible**.

- Audio components of exhibits shall accommodate people who are deaf and need captions or some form of **printed alternatives**.

- All video programs that contain **no audio** shall be identified with a label or caption that says "No Audio."

- Hearing guidelines apply to **mini-theaters** incorporated in museum exhibits. See "Audiovisual Guidelines: Hearing."

- Audio sticks attached to an exhibit must have **adjustable amplification** and must have an alternative, such as laminated printed material attached to the exhibit by a cord. Audio loops can be created for sound sticks. See ABAAS 704.3 and "Publications Guidelines: Visual."

- Provide **descriptions of background sounds** that are part of the exhibits. This also informs hearing visitors.

- Provide **olfactory experiences**, but only within a confined space so that visitors can avoid it if they wish.

.Information desks shall allow for **Text Telephone (TTY)** equipment. See ABAAS 704.4-5.

Exhibits Guidelines: Cognitive

- The exhibits shall present the main interpretive themes on a **variety of levels of complexity,** so they can be understood by people with varying abilities and interests. Information will be presented in a clear, hierarchical manner.

- The exhibits shall **avoid unnecessarily complex and confusing** concepts, unfamiliar expressions, technical terms, and jargon. Pronunciation aids and definitions shall be provided where needed.

- Easy-to-understand **graphic elements** and maps will be used in addition to text to convey ideas.

- Maps shall use color and other creative approaches, such as tactile and audio, to accommodate varying map-reading abilities.

- The exhibits shall be a **multi-sensory experience**. Use techniques to maximize the number of senses used in the exhibits. For example, many people with autism respond to tactile exhibits.

- The **audio description** text shall comply with items above and be presented so that people with varying abilities can understand it. It must be consistent with the other interpretive media in terminology and themes and well-organized. Focus on a limited number of key points and do not confuse the listener with too much information.

- The hands-on opportunity at **living history** areas is helpful to visitors with cognitive and visual impairments.

Exhibits Guidelines: Other

Exhibit Structures

- **Wall corners and display-case edges** and other things people can accidentally bump into should be rounded. During planning, all structures shall be evaluated from this perspective.

Exhibit Signage

■ Information desks should post **access symbols** (low vision, assistive listening systems, and wheelchair-accessible) to promote accessiblilty services.

■ When permanent building signage is required as a part of an exhibit project, follow guidelines in "Park Signage."

Historic Furnishings

Historically refurnished rooms offer a unique interpretive experience by placing visitors in historic spaces. Surrounded by historic artifacts visitors can feel the spaces "come alive" and can relate more directly to the historic events or personalities the park commemorates.

Access to historic furnishings for people with disabilities is an integral part of the visitor experience at NPS sites and is a significant component of programmatic access. Yet accessibility is a challenge in many furnished sites because of the nature of historic architecture. Buildings were erected with a functional point of view at odds with modern standards of accessibility.

Often, reproductions are used to refurnish an historic space. This is an opportunity to provide tactile experiences. Reproducing essential furniture pieces may enable a person who is visually impaired to benefit and participate in the understanding of the historic period or the historic personage.

The approach used to convey the experience of historically furnished spaces will vary from site to site. The goals remain the same: to give the public as rich an interpretive experience as possible given the limitations of the structure.

Historic Furnishings Guidelines

For information on accessible historic furnishings, see "Exhibits."

For information on accessible historic furnishings plans and reports, see "Publications, Reports."

For information on photographic presentations of furnished rooms, audio descriptions of intricate furnishings, and other alternative methods of presentation, see "Appendix D: Alternative Media Formats."

Park Signage

The NPS Sign Program, managed by HFC, provides parks with assistance in developing comprehensive sign plans and in purchasing a wide range of sign types:

Motorist Guidance Signs provide directions to motorists that help them get to parks and to move around within them. Traffic regulatory signs (stop, yield, curve, speed limit, parking, etc.) help ensure that traffic moves smoothly and safely.

Park Identity Signs identify a park entrance and major destinations within a park. They are designed to be consistent with NPS standards and to reflect the character of a park's landscape.

Visitor Information Signs (VIS) provide general information to visitors or information about regulations, resource protection, interpretation, or safety. In addition to signs, the system also includes bulletin cases, brochure dispensers, trash bag dispensers, campsite permit displays, and campsite registration cabinets and other hardware.

Park signs are more successful if they are not ordered individually in a haphazard way, but are the result of a deliberate and well-documented sign communication strategy. A **sign plan** developed for an entire park, or for a selected area within a park, will help visitors get the information they need to make decisions about their park experiences in a more logical manner. Using standardized designs will reduce confusion and eliminate many visual and intellectual roadblocks to good visual communication.

Park Signage Guidelines

Signs that communicate effectively with those who have visual impairments (and those with none) must adhere to certain graphic design principles, especially those of typography. The UniGuide Standards carefully considered the following criteria as established by the Society for Environmental Graphic Design (SEGD) in response to the *Americans with Disabilities Act of 1990*, which has criteria similar to that of Section 504 of the *Rehabilitation Act of 1973,* as amended.

Type Style

Typefaces for the UniGuide Standards were selected for their high legibility. Based on SEGD recommendations, two classic faces were chosen: the sans-serif face Frutiger, initially designed for ease of reading on road guide signs, and Rawlinson (and its variation NPS Roadway) which was developed specifically for the National Park Service. Tests on Rawlinson show that it is a very readable font.

Variations of Rawlinson and Frutiger (e.g., light, extra bold, condensed, expanded, italic, etc.) are generally avoided. In keeping with SEGD guidelines, words of all uppercase letters were used sparingly because they are difficult to read.

Type size

Type sizes used in the UniGuide Standards range from 30-point on signs in the Visitor Information System up to 9-inches on Motorist Guidance and Park Identification Signs.

Letter, Line, and Word Spacing

Regardless of type size, to be easily read the text must have sufficient space between characters, words, and lines. The default settings for both Rawlinson and Frutiger in the UniGuide Standards provide ample letter and word spacing; line spacing may be adjusted according to the type of sign and length of text.

Line Length

UniGuide Standards provide layout grids that help avoid text lines that are too long or too short. Paragraphs are distinguished by an open line space between them rather than by indending. Text is set in a flush-left alignment and hyphens are seldom used, again based on SEGD recommendations.

Color and Contrast

Generally, the higher the contrast between type and its background, the more readable the type. According to the SEGD, contrast may be achieved by black text on a light background or white text on a dark background. UniGuide Standards prescribe either black or white type; other colors are used sparingly for emphasis or to designate specific subjects. Backgrounds are typically dark or mid-tones; white backgrounds create glare.

Content and Layout

SEGD guidelines state that "information (layouts) should follow clear hierarchical patterns, and the elements . . . should be sensibly located and follow logical progressions." Informational signs in the UniGuide Standards present information in easily understood sequences, beginning with a headline, continuing with a text deck that briefly presents the sign's subject or purpose, and concluding with more details, supplemented by illustrations and symbols as appropriate. Purely decorative elements are avoided so that text is presented in clearly defined blocks, again based on SEGD guidelines.

For more information about signage accessibility, see "Accessibility in Parks: Getting the Word Out."

Publications

The **official park brochures** and **handbooks** developed by HFC are known for their reliability, thoroughness, visual appeal, and standard design elements that contribute to NPS graphic identity. The most traditional of the various media, publications remain a core element in a park's interpretive program. As park visitation increases and personal services decrease, the on-site portability of publications give visitors significant interpretive, logistical, and safety information. Publications are the one interpretive medium visitors can take with them as a souvenir and handy home reference. Because publications offer a wide range of information, it is critical that people with disabilities receive the same information—of the same quality—as other visitors.

Parks and other NPS offices produce other types of publications for the public. **Site bulletins** provide more specialized information about a specific site or topic. **Park newspapers** give visitors access to seasonal or temporary topical information not appropriate for the official park brochure. Planning documents like **historic furnishings reports**, **interpretive plans**, **general management plans**, and **conservation reports** provide specialized information for park operations and interpretation.

Official park brochures shall list services and facilities available for persons with disabilities (such as TTY phone numbers) and describe significant barriers. Parks can take this a step further by producing a specialized **Accessibility Site Bulletin** with more detailed information pertinent to visitors with disabilities. A template for this type of site bulletin will be posted on the NPS Graphic Identity Program website. Note that these site bulletins should be in large type and follow the large-print criteria below.

For visitors with low vision, large-print versions of official park brochures and park-produced publications shall be available. Non-text elements—photographs, diagrams, and maps that accompany the text—should be enlarged accordingly, without distortion. Large-print publications must be specially designed rather than overall enlargements of existing publications.

Visitors with visual impairments who cannot read large print shall have access to Contracted (Grade 2) Braille versions or audio descriptions of NPS-produced publications.

Publications that are considered "readily available," like the official park brochure, newspaper, and site bulletins, must also be provided in all alternative formats—Contracted (Grade 2) Braille, large print, audio described, and computer disk. For publications that must be ordered, the same turnaround time is required as for standard print publications.

The *HFC Editorial Style Guide* is a valuable resource for promoting clarity and consistency in publications, which are essential elements of universal accessibility. See www.hfc.nps.gov/hfc-insite/pdf/hfc-style-guide-2007.pdf.

Publications Guidelines: Mobility

■ Park brochures, site bulletins, and sale items shall be distributed from accessible locations and heights. See "Exhibits Guidelines: Mobility."

■ Park brochures and Accessibility Site Bulletins shall carry information on the accessibility of facilities, trails, and programs.

■ Publications shall not have complicated folds. They must be able to unfold with the use of one hand.

Publication Guidelines: Visual

Publications—Standard print size

Text

■ **Fonts:** Making fonts accessible is more than choosing the right font. It is also the proper use of the font: size, leading, tracking, color, contrast, etc.

The standard NPS typefaces are sans-serif Adobe Frutiger Open Type and serif NPS Rawlinson Open Type. For more details, see www.graphics.nps.gov/templates/fonts.htm (available on NPS computers only).

Select and define a type hierarchy based on the organization of the content. Various typographic devices can help differentiate text: size, type weight, numbers, letters, bullets, heads and subheads, and placement.

No extremely extended or compressed typefaces shall be used for body text. For display type, use condensed or extended type treatments sparingly.

■ Avoid overuse of italic type. Most organizations representing people with low vision recommend against the use of italic type since it is difficult to read for those with vision loss. A suitable alternative to italics is the use of quotation marks.

■ **Size:** Use the largest type size appropriate for the format. A suggested size for body text is 10 or 11 points, depending on the font weight, spacing, and column width. Smithsonian Institution and SEGD guidelines recommend 12-point type.

■ **Font size equivilent**: Keep in mind that different fonts appear to different sizes, even when specified at the same size. If a font appears too small, simply increase its point size. For example:

Arial 16 Point, 18 Point

Times New Roman 16 Point, 18 Point

Garamond 16 Point, 18 Point

■ **Leading:** Leading is the measure from the base of one line to the base of the next line. It should be at least 20 percent greater than the font size used. Example: 10 point type on 12 point leading.

Select a type size and leading for the primary text that is appropriate for the size of the page and format. Example: Frutiger 10 point on 12 point leading may be as easy to read as NPS Rawlinson 11 point on 13 point leading.

- **Proportional letterspacing:** Frutiger and NPS Rawlinson are both proportionally letterspaced—see below—making them easier to read as body text. Courier is not proportionally letterspaced.

Frutiger has proportional letterspacing; **mmm** is wider than **iii**.

NPS Rawlinson has proportional letterspacing; **mmm** is wider than **iii**.

`Courier` does NOT have proportional letterspacing; `mmm` is the same width as `iii`.

- Use the standard **typographer's** quotes, apostrophes, dashes, and other punctuation. Word processing and page layout programs provide preference menus that allow for these choices.

- **Body text** and most display type should be set in **caps and lower case**. Reserve ALL CAP usage for short headlines or brief safety warnings.

- **Alignment** should be flush left and rag right.

- Use **hyphenation** sparingly to avoid extremely long or short lines. Avoid using more than two consecutive hyphenated lines.

- **Avoid underlining**. Use italics, bold, or another type device for emphasis. If underlining must be used, make sure it does not touch the underlined letters.

- **Line lengths** should be a maximum of 62 characters (average) per line in body text.

  Select an optimum line length for the format. Lines should be no longer than five inches (the number of characters per line depends on the point size selected).

- **Reversed-out type** (such as white on a black background) should be at least 11 points, medium or bold, sans-serif.

Avoid reversed-out type for documents produced on low-end home or office printers.

■ **Inks and toners** should be applied neither under-inked nor over-inked, for clear, crisp letter forms and image details.

■ **Contrast** of typeface to background should be between 70 percent and 95 percent. Avoid 100 percent black type on white paper. To reduce glare, use 100 percent black type on a five percent toned background or neutral tones paper stock.

Note: This contrast percentage is derived from the directional signage requirements in ADAAG (*Americans with Disabilities Act Accessibility Guidelines*). These specifications are for signage being viewed from a distance of 75 feet with letter sizes of a minimum of 3 inches high on a sign placed 48 to 60 inches from the floor. This guidance is for signage using one or two words such as "Service Entrance" and not for longer text such as is used in exhibits.

A simple test for contrast is to make a black-and-white photocopy of the image-text combination without adjusting the photocopier for contrast. Then check the readability.

A more accurate test would be to change the image/text combination to gray tones in Adobe Photoshop, then take a reading of the percentages of gray.

Avoid printing text copy over areas of an image or tone that is darker than a 30 percent density.

Graphics

■ **Photographs** should have a wide range of grayscale variation. Select black-and-white or color images that have a focused subject and uncomplicated surroundings, especially for printing on low-end printers.

■ **Line drawings** and floor plans should be clear with limited detail, lineweights, and tones,. Labels should be 8-point minimum.

■ If printing in high quantities on **commercial offset presses,** for example through the Government Printing Office (GPO), image resolution should be at least 300 dpi for photos and 1200 dpi for line art.

Paper

■ For low-end printers, the paper should be typical plain stock available in offices and homes. (This is important if site bulletins will be posted online for users.)

■ For offset printing the vendor should specify a paper quality appropriate for the product. To match the Unigrid brochure paper, ask for: white no. 1 coated text, dull-finish, basis weight 70 lbs. per 500 sheets, 25 by 38 inches, equal to JCP Code A261. Use 60 lb. paper as an alternate, but be aware that one side may "show through" to the other.

■ See NPS Graphic Identity Program website listed above for other publication types.

Publications—Large print

A template of an NPS large-print brochure and map is posted on the NPS Graphic Identity website, www.graphics.nps.gov (available on NPS computers only.)

Text

■ **Fonts:** Use sans-serif fonts. The standard NPS sans-serif font is Adobe Frutiger. For more details, see www.graphics.nps.gov/templates/fonts.htm (available to NPS computers only).

Do not use extremely **extended** or compressed fonts.

Do not use *italics* or *decorative* fonts.

■ **Minimum Type Sizes:**
Titles—55 point
Introduction—28.5 point
Body text—17.5 point
Headings— 22 point
Captions—16 point

■ **Leading:** Text—17.5 on 22 point; introduction— 28.5 on 35 point; captions—16 on 20 point.

■ Use **proportional letterspacing,** like Frutiger.

- **Body text** shall be set in **caps and lower** case.

- **Alignment** shall be flush left and rag right. Avoid justified text.

- Use **vertical lines** to separate text columns.

- **Gutter widths** shall be a minimum of 22 mm; **outside margins** may be smaller, but not less than 12 mm.

- **Do not hyphenate words at ends of lines** unless absolutely necessary to avoid extremely long or short lines. (It is better to rewrite the sentence.)

- **Avoid underlining**. If underlining is used, it shall not touch the underlined letters.

- Use **two letter spaces** between sentences, so that sentences have a visually distinct end and beginning.

- Use a **maximum of 41 to 46 characters** (average) per line of body text.

- **Paragraphs:** Use **one line space** open between paragraphs.

  Do not indent paragraphs.

- **Inks and toners** should be applied neither under-inked nor over-inked, for clear, crisp letterforms and image details.

- Do not print type over other **competing textures** (background, photos, graphics, etc). Type printed over some solid tones is acceptable. See "Publications, Standard Print Size, Contrast."

Graphics

- **Photographs** may be color or black-and-white.

  A photograph's primary subject should **clearly contrast** with the surrounding content.

- **Line drawings** or floor plans should be clear and bold, with limited detail and a minimum type size of 16 points for labels.

Color

■ **Color Contrast**: For information, see "Effective Color Contrast" by Aries Arditi, Ph.D., at www.lighthouse.org.

■ **Color combinations** influence readability of text. Recommended color combinations include black/white, black/yellow, dark blue/white, dark green/white. Avoid yellow/grey, yellow/white, blue/green, red/green, and black/violet. (*Courtesy of Design Guidelines for Media Accessibility*, by Parks Canada)

■ **Color-blindness:** see "Publications Guidelines: Visual: Maps—Large Print."

Paper

■ **Surface** should reduce glare. Dull, coated white stock allows crisper letter forms.

■ Paper should have **sufficient weight** to avoid "show-through" on pages printed on both sides.

Folds

■ **Fold configuration** should be as simple and easily understood as possible.

■ Multi-page documents should have a **flexible binding** that allows the opened publication to lie flat.

Maps

Maps are an important component of orientation, wherever the orientation takes place—visitor center, brochure, indoor or outdoor exhibits, or website. Some maps focus on important park features, while others provide topographical information. Still others give interpretive information. People with disabilities must receive same information as people without disabilities.

Maps—Standard Print Size

■ Avoid irrelevant information that adds clutter.

■ **NPS maps** in digital formats are available at www.nps.gov/carto. The specifications for these maps may be obtained by downloading the Adobe Illustrator files and checking the attributes within the file.

■ **Paper:** See guidelines for "Publications—Standard Print Size."

■ **Contrast** of typeface to background shall be at least 70 percent. See "Publications, Standard Print Size, Contrast."

■ **Proportional letterspacing:** See guidelines for "Publications—Standard Print Size."

■ **Labels** shall be set in caps and lower case except for large areas like oceans or mountain ranges.

■ **Map notes** shall be set flush left and rag right.

   Little or **no hyphenation** shall be used at ends of lines.

   No extremely extended or compressed typefaces shall be used for main text.

■ **Fonts:** Use sans-serif, like Frutiger. A simple-serif typeface like NPS Rawlinson may be used for specialized purposes like a historic look.

Maps—Large print

For a prototype large-print map, visit www.nps.gov/hfc/carto/ and select "Chesapeake and Ohio Canal National Historical Park" (CHOH). Compare to the standard print size. The specifications for these maps may be obtained by downloading the Adobe Illustrator files and checking the attributes within the file.

A template of an NPS large-print brochure and map is posted on the NPS Graphic Identity website, www.graphics.nps/gov (available on NPS computers only.

■ **Color-blindness**: People with color blindness cannot distinguish colors in the way that those with normal vision can. The condition is

most commonly inherited. Red/green color blindness is by far the most common form of this condition.

The large-print map for the C&O Canal brochure was designed to accommodate red/green color blindness. This map can be a guide for the development of other park maps to solve the same problem.

To see how a map or image appears to viewers with various forms of color blindness, visit www.vischeck.com (Windows) or coloracle. cartography.ch (Macintosh).

Converting standard-print maps to large-print:

■ **Background tone:** Avoid bright white; it creates excessive glare.

■ **Critical information:** Use a ½-inch margin.

■ **Focus:** Generalize and/or widen line weight or feature.

■ **Roads:** Consider which roads are truly needed for interpretive purposes. Avoid creating solely a "driving map."

Use ivory rather than white for the **road shield** background color.

■ **Type**: Use a sans-serif font like Frutiger. For a heavier weight, use Frutiger Bold rather than Frutiger Black, which is too thick.

For **state names**, use Roman font, 100-percent black instead of gray. State names may be placed in an open area, not necessarily along a state line.

For drainage labels, keep words together rather than spacing out letters too widely.

Use **en dash** in place of a regular hyphen.

Use 18-point, 100 percent black type (Frutiger was used on the C&O map).

■ Mileage Markers:

Use 15-point black type.

Add the label "milepost" to the highest and lowest milepost on the map. This makes it easier to distinguish the other milepost numbers. Also add the label "milepost" to the legend.

- **Symbols:** Limit symbols to just two or three. Use shapes rather than pictographs.

- **Town circles:** Make all of these a uniform size.

- **State lines:** Use dashed lines, 70-percent black.

- Place a relatively heavy holding line around the **legend**.

- Use a 2-point holding line for the distance measure **scale**.

- Use a compass rose to indicate "north" (and other directions).

Tactile Maps

- There are many factors that make tactile maps accessible and functional for people who are blind, including size, depth, location, audio description, texturing, keys, legends, and degree of detail.

- Tactile maps may provide the primary information for people who are visually impaired, but they also benefit persons cognitive disabilities, children—and others. As three-dimensional presentations they provide visual stimulation.

- Raised-line or tactile maps can be made using our present digital files and, for example, a thermoform machine. Lines are distinguished by line weight, color, and height. Areas are distinguished by color, height, and texture.

- Tactile maps are currently being developed by the NPS. Visit www.nps.gov/hfc/accessibility for more information on tactile maps.

Audiovisual Formats

- Printed material will also be available on CD or MP3 and the NPS individual park websites. Handbooks and other publications shall be similarly recorded. Graphics will be audio-described. Some graphics may not be available because of copyright restrictions.

- The audio version shall be sound-indexed for easy choice of starting and stopping points for listening.

- The audio version shall present clear, high-quality sound.

- All AV devices should enable users to forward and reverse throughout the entire program.

- Where possible, depending on the equipment used, variable speech output speed should be available.

For additional information, see "Appendix D: Alternative Media Formats."

Word Processing Formats

Printed material should be available in a word-processing format. See "Reports" below.

Braille

- Printed material shall be available in Contracted (Grade 2) Braille, and shall comply with ABAAS 703.3 and 703.4.

- Braille shall be produced in full conformance with the currently applicable codes set forth by the Braille Authority of North America (BANA). The BANA codebook is *English Braille, American Edition*. Use the latest edition. For more information, see www.brailleauthority.org.

- Do not just Jumbo Braille (large dot Braille).

- Do not combine large-print and Braille in the same document.

Reports

- Reports will be **accessible** (electronic versions for people with low vision and blind) to the parks and public.

- **Plain text files** are the most likely to be accessible to all computer users who are blind. We recommend using Microsoft Word. Most people either use Microsoft Word or have methods to convert files. Again, plain text and HTML are generally the most universally accessible choices.

- **Electronic readers** can best read the sans-serif font Arial without italics.

- **Other Specialized Formats:** The following is from *A Guide to Making Documents Accessible to People Who Are Blind or Visually Impaired* by Jennifer Sutton, published by the American Council of the Blind www.acb.org/accessible-formats.html#ag16.

  Adobe and Microsoft have made efforts to accommodate blind and visually impaired people who need to read documents generated by their specialized software. Companies' efforts to work with assistive technology vendors to resolve compatibility issues have been somewhat successful. Accessible documents in Microsoft's Reader format or in Adobe PDF must be constructed in very specific ways, be created with particular settings enabled, and generated in this file format. It is risky to assume that everyone can open a Microsoft Word document and follow guidelines that Adobe and Microsoft each outline. To get started with producing Adobe documents, see the booklet "How To Create Accessible Adobe PDF Files." For information about creating accessible Microsoft Reader® files, see " Microsoft Reader—Accessibility Frequently Asked Questions."

  In addition to being sure that documents meet these criteria, a company should be aware that blind or visually impaired people must have technology that conforms to Microsoft's requirements, they must have downloaded Microsoft's Reader software, and they must have it configured to read accessible texts. In order to read Adobe's PDF documents, people must again have the most up-to-date assistive technology software, and they must install and configure the necessary Adobe plug-in. Even accessible documents in these formats do not always allow for maximum flexibility and user preferences with respect to reading, printing, or portability.

So, while these documents can and should be made available in a specialized format to those people who choose to use them in that format, offering another universally accessible document-type, such as HTML or plain text, is advisable. Though specialized formats allow the document to be read by sighted people exactly as intended, these formats are not nearly as useful and friendly to blind readers.

■ **Reports shall be posted online for easy access.**

NPS Media Inventory Database System (MIDS): www.hfc.nps.gov/mids. Park staffs are responsible for posting reports to MIDS.

Park Websites: www.nps.gov. Be aware that if there is copyrighted material in the report, it cannot be posted on a public site without permission from the copyright holder(s). If in doubt, post a version without the copyrighted material.

Publications Guidelines: Hearing

The park-produced **Accessibility Site Bulletin and newspaper** will note the availability of programs that provide sign language interpretation, captioning, transcripts, and assistive listening systems. The publication should provide information on how to obtain these services.

Publications Guidelines: Cognitive

■ The park-produced **Accessibility Site Bulletin and newspaper** will list programs available for these visitors.

■ Topics will be **specific and of general interest**. Unnecessary complexity and confusing concepts shall be avoided. Information shall be presented in a clear, hierarchical manner.

■ Whenever possible, use **easy-to-understand graphic elements** to convey ideas, rather than text alone.

■ Avoid **unfamiliar expressions, technical terms, and jargon**. Pronunciation aids and definitions will be provided where needed.

■ Use **concise language and simple sentence construction**. Avoid unfamiliar words and long paragraphs.

■ **Audio Description**: The text of the audio description shall comply with items above and be presented so that people with varying abilities can understand it. It must be consistent with the other interpretive media in terminology and themes and be well organized. It should focus on a limited number of key points and not confuse the listener with too much information.

■ Maps shall establish a focus and use color and other creative approaches. They may be tactile and/or audio to accommodate users with varying map-reading abilities.

Wayside Exhibits

Wayside exhibits are large-format outdoor sign-like exhibits that the National Park Service employs either to orient visitors arriving to a new location, or to reveal the stories hidden in the view. These panels combine photographs, artwork, diagrams or maps, and texts that are written to be easy to read aloud. The goal is both to describe the landscape and to reveal the significance of an outdoor place being preserved as part of the National Park System.

To make sense, waysides must be placed where a particular story intersects a particular view. Most NPS waysides are installed at trailheads, vistas, overlooks, or along front-country trails. Since NPS waysides are usually near sidewalks, hardened-surface trails, and parking areas, most are accessible to wheelchair users. But some waysides will be inaccessible to visitors with limited mobility, due to rough trail conditions and grades.

NPS managers and interpreters must constantly keep in mind that standard waysides provide little benefit to visitors who cannot see. Old-style audio message repeaters that the NPS formerly installed alongside waysides have not solved this problem because the hardware often fails outdoors. Audio technologies are emerging that can provide visitors who are blind or visually impaired access to the information that waysides deliver. NPS planners and designers are required to seek ways to include audio elements in each future waysides project.

Because waysides are outdoors, color choices in panel design matter. Glare from sunlight must be avoided. Constant exposure to strong sunlight fogs and fades ink pigments so that lettering falls below legibility limits. Program accessibility is not just a matter of installing accessible waysides. Wayside exhibits are a prime example of an why an NPS program must be maintained in order for it to continue to be accessible. A regular inspection and panel replacement routine will keep waysides looking their best and solve many legibility problems.

Providing arriving visitors with basic orientation to an NPS site is a program; therefore it must be available to all visitors and delivered in an equitable fashion.

Good waysides should direct attention to the features they interpret, not to themselves. Writing should be focused and compressed. Waysides that work best avoid complex topics and multiple layers of infor-

mation. Graphic elements must be organized to be powerful enough to draw visitors into the story.

For more information, visit www.nps.gov/hfc/products/waysides/way-process-access.htm. See "NPS Wayside Exhibit Map Standards" and "NPS Wayside Exhibit Typographic Standards."

Wayside Exhibits Guidelines: Mobility

■ Wayside exhibits will be installed at wheelchair-accessible locations wherever possible. (See "Exhibits Guidelines: Mobility.")

■ Wayside exhibit panels shall be installed at heights and angles favorable for viewing by all visitors, including wheelchair users. For standard NPS low-profile exhibits (angled at 30 or 45 degrees) the recommended height is 32 inches from the bottom of the exhibit frame to finished grade; for upright exhibits and bulletin boards the height is 24–36 inches from the bottom of the exhibit frame to finished grade, depending on panel size.

■ Trailhead exhibits shall include accessibility advisory information.

■ Wayside exhibits shall have level, firm, hard-surfaced, and slip-resistant exhibit pads.

■ Exhibit sites shall offer clear, unrestricted views of park features referred to in the exhibits.

■ Park staff shall also consider posting wayside content (excluding copyrighted material) on the park website.

Wayside Exhibits Guidelines: Vision

■ Exhibit typography shall be legible and readable and conform to the "NPS Wayside Exhibit Typographic Standards," www.nps.gov/hfc/products/waysides/way-pdfs.htm

■ Panel colors shall be selected to reduce eyestrain and glare and to provide excellent readability under field conditions. Because of its reflectivity, white will not be used as a background color.

■ Selected wayside exhibits shall incorporate tactile elements like models, texture blocks, and relief maps.

- Selected wayside exhibits shall incorporate audio stations that include audio description (see "Exhibits Guidelines: Visual" in this document).

- For all major features interpreted by graphic wayside exhibits, the park staff shall offer non-visual interpretation (i.e. audio description) of the same subject matter. Examples include audio tours like digital audio players, radio systems or dial-up messages for cellular phone users, and ranger talks.

- Park staff shall also consider posting wayside content on the park website. Be mindful of copyright restrictions.

Wayside Exhibits Guidelines: Hearing

- Wayside exhibit panels shall communicate visually and will rely heavily on graphics to interpret park resources.

- Other information in audio station messages (music, sound effects, etc.) shall be available in alternative formats: as part of the exhibit, transcript, captioning via a hand-held mobile device, or assistive listening systems via a hand-held mobile device. Note: Hand-held devices require fewer repairs or replacements than built-in outdoor equipment. These devices must be available during all times when visitors can access the waysides and not just when visitor centers are open.

See "Exhibits Guidelines: Hearing."

Wayside Exhibits Guidelines: Cognitive

- Topics will be specific and of general interest. Complex and confusing concepts should be avoided. Information will be presented in a clear hierarchical manner.

- Easy-to-understand graphic elements will be used to convey ideas, rather than text alone.

- Unfamiliar expressions, technical terms, and jargon will be avoided. Pronunciation aids and definitions will be provided as needed.

- Text will be concise, with short paragraphs.

- Audio Description: The text of the audio description should comply with items above and be presented so that people with varying abili-

ties can understand it. It needs to be consistent with the other interpretive media in terminology and themes and be well organized. It should focus on a limited number of key points and not confuse the listener with too much information.

■ Maps shall use color and other creative approaches such as tactile and/or audio elements to accommodate users of varying map-reading abilities.

Web-based Media

Web-based media are pages published on the Internet. The NPS uses them give virtual visitors orientation and interpretive information about the national park programs and sites. Like publications and waysides, web pages combine photographs, artwork, diagrams, maps, and easy-to-read text.

All federal websites must comply with Section 508 of the *Rehabilitation Act of 1973*, as amended, chapter 1194.22," Web-based intranet and internet information and applications" published by the Architectural and Transportation Barriers Compliance Board (December 21, 2000). Section 508 requires that individuals with disabilities, who are members of the public seeking information or services from a Federal agency, have access to and use of information and data comparable to that provided to the public who are not individuals with disabilities, unless an undue burden would be imposed on the agency.

Good web-based media should follow these principles of accessible website design:

■ Design your website for use in the broadest possible range of web browsers. Consider the wide array of browsers, including Internet Explorer, Firefox, Opera, Safari, text only, and screen readers. There also are different versions of these browsers.

■ Separate structure from presentation. Use HTML, XHTML and XML for structure. Use CSS (Cascading Style Sheets) and XSL (Extensible Stylesheet Language) for style. Test your pages for proper structure and readability with the style sheets disabled. Avoid use of deprecated tags.

■ In the HEAD of your HTML documents, use the right DOCTYPE: HTML 4.01 Transitional. Identify primary language: EN.

■ Provide text alternatives to visual and audio content.

■ Provide information that serves the same purpose as audio or visual media in ways suited to alternate sensory channels.

■ Make language brief, clean, and simple. Write out abbreviations the first time they occur in a document.

■ Provide clear and understandable navigation tools and orientation information. Use appropriate language for all your hyperlinks. Bad: "for a description of our program, <u>click here</u>." Good: "for a description of our program, please <u>visit our program info page</u>."

For more information, see www.section508.gov; "Web Accessibility Initiative," www.w3.org/WAI; and "Appendix A: Laws, Regulations, and Policies."

Accessibility in Parks: Getting the Word Out

Building an audience takes time. Once a facility or program is accessible, promote it! Provide information on how to obtain these services. Also, include phone contact information for visitors with questions.

Note: In referring to persons with disabilities, avoid using "handicapped" or "the disabled." Put the person before the disability; use "persons with disabilities," "visitors with low vision," etc.

Accessibility Site Bulletins

Each park shall produce a site bulletin on the topic of accessibility. See "Publications."

Signage

Accessibility means little if visitors don't know what features are available. Post the appropriate symbols and information at the ticket and information desks, outside the theater, and beside any appropriate exhibits or facility.

Sign language interpreter name bars shall be worn by staff who are qualified.

Advertisements, Mailings, and Websites

- Using **accessibility symbols** in mailings, advertisements and the park website reinforces the accessibility signage at the park.

■ **Education programs**: Make available a request form for accommodations needed.

■ **Know your audience**: Identify local organizations and schools that focus on disabilities, like the Lions Club, schools for the deaf, disabled veterans groups, etc. Maintain contact with these groups to promote accessible programs.

■ The phrase "**headset or neck loop are available**" or "**T-coil or hearing-aid compatible**" should be included under the symbol so visitors know what type of equipment is available. An alternative T-coil compatible symbol is available at www.hearingloop.org.

Headsets available
Neck Loops available
T-coil compatible
Hearing-aid compatible

Staff Training

■ Develop a staff training guide for management, maintenance, repair and distribution of accessibility programs and equipment for visitor use.

■ Provide staff with sensitivity training in accessibility issues. Be sure staff knows basic courtesy and disability etiquette, and current and correct terms for the equipment.

■ Make sure that more than one staff member knows:

Where the equipment and manuals are located.

How to make sure the equipment is working before being handed out.

How to explain the equipment to visitors.

How to operate the various pieces of accessibility equipment—lifts, captioning boards, chargers for audio tour equipment, any displays that have interactive features, etc.

What to do if something is not working.

How to store and maintain the equipment properly.

How to use the TTY. Staff should be sure it is in good working order if a visitor asks to use it.

■ A good resource for staff training on accessibility and distribution of ALDs is: *Assistive Listening Devices for People with Hearing Loss: A Guide for Performing Arts Settings*, The Kennedy Center, www.kennedy-center.org/accessibility/guide_alds_KC.pdf

Getting the Word Out: Good Examples

American Museum of Natural History
www.amnh.org/museum/welcome/accessibility/

The Frick Collection
www.frick.org/information/access.htm

Hillwood Estate, Museum and Gardens
www.hillwoodmuseum.org/planningyourvisit.htm#visitor

Lincoln Center for the Performing Arts
www.lincolncenter.org/load_screen.asp?screen=visitorinfo_accessibility

Lower East Side Tenement Museum
www.tenement.org/vizinfo_ada.html

New-York Historical Society
www.nyhistory.org/web/default.php?section=visitor_information&page=accessibility

Appendix A: Laws, Regulations, and Policies

The National Park Service is committed to providing interpretive media that are accessible to all potential users. Media shall be planned, designed, fabricated, and installed consistent with the following laws, regulations, and policies that govern accessibility in interpretive media:

■ **Architectural Barriers Act of 1968 (ABA**)

Americans with Disabilities Act and Architectural Barriers Act Accessibility Guidelines (same as *Architectural Barriers Act Accessibility Standards,* **ABAAS**). Federal facilities must adhere to ABA Chapters 1–10. *For more information, see www.access-board.gov/ada-aba/index.htm.*

■ **Rehabilitation Act of 1973, as amended, Section 504**:

Sec. 17.549 Program accessibility: Discrimination prohibited.

Except as otherwise provided in Sec. 17.550, no qualified handicapped person shall, because the agency's facilities are inaccessible to or unusable by handicapped persons, be denied the benefits of, be excluded from participation in, or otherwise be subjected to discrimination under any program or activity conducted by the agency.

Sec. 17.550 Program accessibility: Existing facilities.

(a) General. The agency shall operate each program or activity so that the program or activity, when viewed in its entirety, is readily accessible to and usable by handicapped persons. This paragraph does not –

(1) Necessarily require the agency to make each of its existing facilities or every part of a facility accessible to and usable by handicapped persons;

(2) In the case of historic preservation programs, require the agency to take any action that would result in a substantial impairment of significant historic features of an historic property; or

(3) Require the agency to take any action that it can demonstrate would result in a fundamental alteration in the nature of a program or activity or in undue financial and administrative burdens. In

those circumstances where agency personnel believe that the proposed action would fundamentally alter the program or activity or would result in undue financial and administrative burdens, the agency has the burden of proving that compliance with Sec. 17.550 (a) would result in such an alteration or burdens. The decision that compliance would result in such alteration or burdens must be made by the agency head or his or her designee after considering all agency resources available for use in the funding and operation of the conducted program or activity, and must be accompanied by a written statement of the reasons for reaching that conclusion. If an action would result in such an alteration or such burdens, the agency shall take any other action that would not result in such an alteration or such burdens but would nevertheless ensure that handicapped persons receive the benefits and services of the program or activity.

(b) Methods–

(1) General. The agency may comply with the requirements of this section through such means as redesign of equipment, reassignment of services to accessible locations, assignment of aides to beneficiaries, home visits, delivery of services at alternate accessible sites, alteration of existing facilities and construction of new facilities, use of accessible rolling stock, or any other methods that result in making its programs or activities readily accessible to and usable by handicapped persons. The agency is not required to make structural changes in existing facilities where other methods are effective in achieving compliance with this section. The agency, in making alterations to existing buildings, shall meet accessibility requirements to the extent compelled by the Architectural Barriers Act of 1968, as amended (42 U.S.C. 4151-4157) and any regulations implementing it. In choosing among available methods for meeting the requirements of this section, the agency shall give priority to those methods that offer programs and activities to qualified handicapped persons in the most integrated setting appropriate.

(2) Historic preservation programs. In meeting the requirements of paragraph (a) of this section in historic preservation programs, the agency shall give priority to methods that provide physical access to handicapped persons. In cases where a physical alteration to an historic property is not required because of paragraph (a)(2) or (a)(3) of this section, alternative, methods of achieving program accessibility include–

(i) Using audio-visual materials and devices to depict those portions of an historic property that cannot otherwise be made accessible.

(ii) Assigning persons to guide handicapped persons into or through portions of historic properties that cannot otherwise be made accessible; or

(iii) Adopting other innovative methods.

(3) Recreation programs. In meeting the requirements of paragraph (a) in recreation programs, the agency shall provide that the program or activity, when viewed in its entirety, is readily accessible to and usable by handicapped persons. When it is not reasonable to alter natural and physical features, accessibility may be achieved by alternative methods as noted in paragraph (b)(1) of this section.

(c) Time period for compliance. The agency shall comply with the obligations established under this section within sixty (60) days of the effective date of this part except that where structural changes in facilities are necessary, such changes shall be made within three years of the effective date of this part, but in any event as expeditiously as possible.

(d) Transition plan. In the event that structural changes to facilities are necessary to achieve program accessibility, the agency shall develop, within six months of the effective date of this part, a transition plan setting forth the steps necessary to complete such changes. The plan shall be developed with the assistance of interested persons, including handicapped persons or organizations representing handicapped persons. A copy of the transition plan shall be made available for public inspection. The plan shall, at a minimum–

(1) Identify physical obstacles in the agency's facilities that limit the accessibility of its programs or activities to handicapped persons;

(2) Describe in detail the methods that will be used to make the facilities accessible;

(3) Specify the schedule for taking the steps necessary to achieve compliance with this section and, if the time period of the transition plan is longer than one year, identify steps that will be taken during each year of the transition period;

(4) Indicate the official responsible for implementation of the plan; and

(5) Identify the persons or groups with whose assistance the plan was prepared.

Sec. 17.551 Program accessibility: New construction and alterations.

Each building or part of a building that is constructed or altered by, on behalf of, or for the use of the agency shall be designed, constructed, or altered so as to be readily accessible to and usable by handicapped persons. The definitions, requirements, and standards of the *Architectural Barriers Act* (42 U.S.C. 4151-4157) as established in 41 CFR 101-19.600 to 101-19.607 apply to buildings covered by this section.

Sec. Sec. 17.552-17.559 [Reserved]

Sec. 17.560 Communications.

(a) The agency shall take appropriate steps to ensure effective communication with applicants, participants, personnel of other Federal entities, and members of the public.

(1) The agency shall furnish appropriate auxiliary aids where necessary to afford a handicapped person an equal opportunity to participate in, and enjoy the benefits of, a program or activity conducted by the agency.

(i) In determining what type of auxiliary aid is necessary, the agency shall give primary consideration to the requests of the handicapped person.

(ii) The agency need not provide individually prescribed devices, readers for personal use or study, attendant services, or other devices of a personal nature.

(2) Where the agency communicate with applicants and beneficiaries by telephone, telecommunications devices for deaf persons (TDD's) or equally effective telecommunication systems shall be used.

(b) The agency shall ensure that interested persons, including persons with impaired vision or hearing, can obtain information as to the existence and location of accessible services, activities, and facilities.

(c) The agency shall provide signage at a primary entrance to each of its inaccessible facilities, directing users to a location at which they can obtain information about accessible facilities. The international symbol for accessibility shall be used at each primary entrance of an accessible facility.

(d) This section does not require the agency to take any action that it can demonstrate would result in a fundamental alteration in the nature of a program or activity or in undue financial and administrative burdens. In those circumstances where agency personnel believe that the proposed action would fundamentally alter the program or activity or would result in undue financial and administrative burdens, the agency has the burden of proving that compliance with Sec. 17.560 would result in such alteration or burdens. The decision that compliance would result in such alteration or burdens must be made by the agency head or his or her designee after considering all agency resources available for use in the funding and operation of the conducted program or activity, and must be accompanied by a written statement of the reasons for reaching that conclusion. If an action required to comply with this section would result in such alteration or such burdens, the agency shall take any other action that would not result in such an alteration or such burdens but would nevertheless ensure that, to the maximum extent possible, handicapped persons receive the benefits and services of the program or activity.

For the Department of Interior's Section 504, visit www.nps.gov/hfc/accessibility.

■ **Rehabilitation Act of 1973, as amended, Section 508**:

Section 508 of the Rehabilitation Act of 1973, as amended, requires that all Federal agencies ensure that when they develop, procure, maintain, or use electronic and information technology; that, it is accessible to employees with disabilities. It also requires that individuals with disabilities who are seeking information or services from Federal agencies have access to and use of all information provided. Electronic and information technology is expansively defined. It includes computers (such as hardware, software, and accessible data such as web pages), facsimile machines, copiers, telephones, and other equipment used for transmitting, receiving, using, or storing information. Section 508 of the Rehabilitation Act of 1973, as amended, applies specifically to web-based media, audio tours, audiovisual programs, and other media incorporating these electronic elements.

The following is an excerpt from the *Electronic and Information Technology Accessibility Standards Architectural and Transportation Barrers Compliance Board [36CFR Part 1194* published in the *Federal Register* on December 21, 2000]:

§ 1194.22 Web-based intranet and internet information and applications.

(a) A text equivalent for every non-text element shall be provided (e.g., via "alt", "longdesc", or in element content).

(b) Equivalent alternatives for any multimedia presentation shall be synchronized with the presentation.

(c) Web pages shall be designed so that all information conveyed with color is also available without color, for example from context or markup.

(d) Documents shall be organized so they are readable without requiring an associated style sheet.

(e) Redundant text links shall be provided for each active region of a server-side image map.

(f) Client-side image maps shall be provided instead of server-side image maps except where the regions cannot be defined with an available geometric shape.

(g) Row and column headers shall be identified for data tables.

(h) Markup shall be used to associate data cells and header cells for data tables that have two or more logical levels of row or column headers.

(i) Frames shall be titled with text that facilitates frame identification and navigation.

(j) Pages shall be designed to avoid causing the screen to flicker with a frequency greater than 2 Hz and lower than 55 Hz.

(k) A text-only page, with equivalent information or functionality, shall be provided to make a web site comply with the provisions of this part, when compliance cannot be accomplished in any other way. The content of the text-only page shall be updated whenever the primary page changes.

(l) When pages utilize scripting languages to display content, or to create interface elements, the information provided by the script shall be identified with functional text that can be read by assistive technology.

(m) When a web page requires that an applet, plug-in or other application be present on the client system to interpret page content, the page must provide a link to a plug-in or applet that complies with §1194.21(a) through (l).

(n) When electronic forms are designed to be completed on-line, the form shall allow people using assistive technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues.

(o) A method shall be provided that permits users to skip repetitive navigation links.

(p) When a timed response is required, the user shall be alerted and given sufficient time to indicate more time is required.

§ 1194.24 Video and multimedia products.

(a) All analog television displays 13 inches and larger, and computer equipment that includes analog television receiver or display circuitry, shall be equipped with caption decoder circuitry which appropriately receives, decodes, and displays closed captions from broadcast, cable, videotape, and DVD signals. As soon as practicable, but not later than July 1, 2002, widescreen digital television (DTV) displays measuring at least 7.8 inches vertically, DTV sets with conventional displays measuring at least 13 inches vertically, and stand-alone DTV tuners, whether or not they are marketed with display screens, and computer equipment that includes DTV receiver or display circuitry, shall be equipped with caption decoder circuitry which appropriately receives, decodes, and displays closed captions from broadcast, cable, videotape, and DVD signals.

(b) Television tuners, including tuner cards for use in computers, shall be equipped with secondary audio program playback circuitry.

(c) All training and informational video and multimedia productions which support the agency's mission, regardless of format, that contain speech or other audio information necessary for the comprehension of the content, shall be open or closed captioned.

(d) All training and informational video and multimedia productions which support the agency's mission, regardless of format, that contain visual information necessary for the comprehension of the content, shall be audio described.

(e) Display or presentation of alternate text presentation or audio descriptions shall be user-selectable unless permanent.

§ 1194.25 Self contained closed products.

(a) Self contained products shall be usable by people with disabilities without requiring an end-user to attach assistive technology to the product. Personal headsets for private listening are not assistive technology.

(b) When a timed response is required, the user shall be alerted and given suffi cient time to indicate more time is required.

(c) Where a product utilizes touchscreens or contact-sensitive controls, an input method shall be provided that complies with §1194.23 (k) (1) through (4).

(d) When biometric forms of user identification or control are used, an alternative form of identifi cation or activation, which does not require the user to possess particular biological characteristics, shall also be provided.

(e) When products provide auditory output, the audio signal shall be provided at a standard signal level through an industry standard connector that will allow for private listening. The product must provide the ability to interrupt, pause, and restart the audio at anytime.

(f) When products deliver voice output in a public area, incremental volume control shall be provided with output amplification up to a level of at least 65 dB. Where the ambient noise level of the environment is above 45 dB, a volume gain of at least 20 dB above the ambient level shall be user selectable. A function shall be provided to automatically reset the volume to the default level after every use.

(g) Color coding shall not be used as the only means of conveying information, indicating an action, prompting a response, or distinguishing a visual element.

(h) When a product permits a user to adjust color and contrast settings, a range of color selections capable of producing a variety of contrast levels shall be provided.

(i) Products shall be designed to avoid causing the screen to flicker with a frequency greater than 2 Hz and lower than 55 Hz.

(j) Products which are freestanding, non-portable, and intended to be used in one location and which have operable controls shall comply with the following:

(1) The position of any operable control shall be determined with respect to a vertical plane, which is 48 inches in length, centered on the operable control, and at the maximum protrusion of the product within the 48 inch length (see Figure 1 of this part).

(2) Where any operable control is 10 inches or less behind the reference plane, the height shall be 54 inches maximum and 15 inches minimum above the floor.

(3) Where any operable control is more than 10 inches and not more than 24 inches behind the reference plane, the height shall be 46 inches maximum and 15 inches minimum above the floor.

(4) Operable controls shall not be more than 24 inches behind the reference plane (see Figure 2 of this part).

For more information, visit www.section508.gov.

Denver Service Center (NPS) Design Standards
workflow.den.nps.gov/staging/6_Design/Designstandards/DesignStds_access_section.htm

National Park Service Policies

■ **Director's Order 16A: Reasonable Accommodation for Applications and Employees with Disabilities**
www.nps.gov/policy/DOrders/DOrder16a.htm.

■ **Director's Order 42: Accessibility for Visitors with Disabilities in National Park Service Programs and Services**
See www.nps.gov/policy/DOrders/DOrder42.html.

■ **Management Policies 2006: A Guide to Managing the National Park System**
www.nps.gov/policy/mp/Index2006.htm

■ Director's Memo #D24 (2420)

Appendix B: Accessibility Resources

Federal Government

Harpers Ferry Center—Accessibility
Includes updates for these Guidelines, DOI Section 504, photographs of best practices, and more.
www.nps.gov/hfc/accessibility

Inside NPS
inside.nps.gov/index.cfm?handler=quicklinks&area=accessibility

NPS Online Resources
www.nps.gov/access/resources_online.htm

Harpers Ferry Center Editorial Style Guide
www.hfc.nps.gov/hfc-insite/pdf/hfc-style-guide-2007.pdf

NPS Graphic Identity Program
Includes fonts, templates for Accessibility Site Bulletin and large-print brochures and maps, and more.
www.graphics.nps.gov

Principles of Universal Design
www.nps.gov/hfc/univ-design.htm

Department of the Interior
www.doi.gov/accessibility.html

Department of the Interior Accessibility Technology Center
www.doi.gov/atc/index.html
www.doi.gov/atc/architectural.html
www.doi.gov/atc/atalist.html#hear (list of assistive technology accommodations)

DisabilityInfo.gov
www.disabilityinfo.gov

Federal Communications Commission
www.fcc.gov/cgb/caption.html

Other Organizations

General

Smithsonian Institution
www.si.edu/opa/accessibility/exdesign/start.htm

National Center on Accessibility
www.ncaonline.org

Society for Environmental Graphic Design
www.segd.org

National Endowment for the Arts
www.nea.gov/resources/Accessibility/index.html

The Center for Universal Design, Environments and Products for All People, North Carolina State University
www.design.ncsu.edu/cud/

Parks Canada
Design for Media Accessibility (publication)

Arizona State University Libraries
www.asu.edu/lib/ada/geninfo/definitions/index.htm

Web Accessibility Initiative
www.w3.org/WAI

Hearing

Assistive Listening Devices for People with Hearing Loss: A Guide for Performing Arts Settings, **The Kennedy Center**
www.kennedy-center.org/accessibility/guide_alds_KC.pdf

National Association of the Deaf
www.nad

Vision

Braille Authority of North America (BANA)
Includes Braille codes used by the NPS, *English Braille, American Edition*.
www.brailleauthority.org/

Braille through Remote Learning (BRL)
Includes BRL: Contraction Lookup Dictionary
www.brl.org/refdesk/conlookup.html

American Foundation for the Blind
www.afb.org/

Lighthouse International
www.lighthouse.org/

Baruch College , Tactile and Large Print Maps
www.baruch.cuny.edu/ccvip/tactual_maps.html

Cognitive

American Association on Intellectual and Developmental Disabilities
(AAIDD)
www.aamr.org

Appendix C: The Principles of Universal Design

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The design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.

The authors, a working group of architects, product designers, engineers and environmental design researchers, collaborated to establish the following Principles of Universal Design to guide a wide range of design disciplines including environments, products, and communications.

These seven principles may be applied to evaluate existing designs, guide the design process and educate both designers and consumers about the characteristics of more usable products and environments. The Principles of Universal Design are presented here, in the following format: name of the principle, intended to be a concise and easily remembered statement of the key concept embodied in the principle; definition of the principle, a brief description of the principle's primary directive for design; and guidelines, a list of the key elements that should be present in a design which adheres to the principle. (Note: all guidelines may not be relevant to all designs.)

Principle 1: Equitable Use
The design is useful and marketable to people with diverse abilities.
Guidelines:

1a. Provide the same means of use for all users: identical whenever possible; equivalent when not.

1b. Avoid segregating or stigmatizing any users.

1c. Provisions for privacy, security, and safety should be equally available to all users.

1d. Make the design appealing to all users.

Principle 2: Flexibility in Use

The design accommodates a wide range of individual preferences and abilities. Guidelines:

2a. Provide choice in methods of use.

2b. Accommodate right- or left-handed access and use.

2c. Facilitate the user's accuracy and precision.

2d. Provide adaptability to the user's pace.

Principle 3: Simple and Intuitive Use

Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level. Guidelines:

3a. Eliminate unnecessary complexity.

3b. Be consistent with user expectations and intuition.

3c. Accommodate a wide range of literacy and language skills.

3d. Arrange information consistent with its importance.

3e. Provide effective prompting and feedback during and after task completion.

Principle 4: Perceptible Information

The design communicates necessary information efffectively to the user, regardless of ambient conditions or the user's sensory abilities. Guidelines:

4a. Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.

4b. Provide adequate contrast between essential information and its surroundings.

4c. Maximize "legibility" of essential information.

4d. Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions).

4e. Provide compatibility with a variety of techniques or devices used by people with sensory limitations.

Principle 5: Tolerance for Error
The design minimizes hazards and the adverse consequences of accidental or unintended actions.Guidelines:

5a. Arrange elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded.

5b. Provide warnings of hazards and errors.

5c. Provide fail safe features.

5d. Discourage unconscious action in tasks that require vigilance.

Principle 6: Low Physical Effort
The design can be used effi ciently and comfortably and with a minimumof fatigue. Guidelines:

6a. Allow user to maintain a neutral body position.

6b. Use reasonable operating forces.

6c. Minimize repetitive actions.

6d. Minimize sustained physical eff ort.

Principle 7: Size and Space for Approach and Use
Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility. Guidelines:

7a. Provide a clear line of sight to important elements for any seated or standing user.

7b. Make reach to all components comfortable for any seated or standing user.

7c. Accommodate variations in hand and grip size.

7d. Provide adequate space for the use of assistive devices or per sonal assistance.

Please note that the Principles of Universal Design address only univer-sally usable design, while the practice of design involves more than consideration for usability. Designers must also incorporate other considerations such as economic, engineering, cultural, gender, and environmental concerns in their design processes. These Principles off er designers guidance to better integrate features that meet the needs of as many users as possible.

Appendix D: Alternative Media Formats

Many accessibility problems can be addressed by providing interpretive information in multiple formats to accommodate specific audiences. A word of caution: the presentation must equal to the quantity and quality of the original on which it is based so as to provide an equitable experience or the user.

When purchasing software or hardware that will interface with an interpretive exhibit, the process of purchasing must adhere to all requirements identified in the section 508 of the *Rehabilitation Act of 1973*, as amended.

Alternative formats include, but are not limited to:

■ For physically inaccessible places, for example an exhibit on an inaccessible second floor of a historic building, a method of alternate accommodation of equal quality will be provided, such as photographic, video, audio, or web-based program/tours, visual aids, tactile reproductions, dioramas, audio description, photo albums, personal services, etc.

■ Computer interactive programs.

■ Audio and video podcasts or downloadable files.

■ Interactive web features.

■ Real-time video viewing.

■ Large-print publications, maps, audio tours, transcripts, etc.

■ Red-green color-blind sensitive publications, maps, design, and type.

■ Plain text files for use with electronic readers, portable scanners, and other assistive devices.

■ Audio descriptions of graphic, video, and exhibit content, including audio tours. This includes providing a computer CD disk, MP3, audio cassette, etc. to the visitor upon request and availability via the park website. See "Publications" for copyright issues.

- Word processing formats.

- Contracted (Grade 2) Braille publications, exhibit labels, and interactive devices.

- Tactile maps, graphics, and models.

- Scripts: standard and large print size formats. Note: Scripts are not an alternative format, but are required.

- On-screen captions.

- Caption boards.

- Assistive listening systems:

  Transmitters: Radio-frequency, infrared, and induction loops.

  Receivers: Headsets, earbuds, hearing aids with T-coils, and audio sticks.

More information on visual alternative formats can be found at: www.ncaonline.org/monographs/3alternative-formats.shtml

Appendix E: NPS Accessibility Pictograph Symbols

Mobility Wheelchair-accessible

Hearing Closed captioning (CC)

Open captioning (OC)

Volume control telephone

Telephone text service (TTY)

Assistive listening systems

Sign language interpretation

Sight Large print

Braille

Low vision access

Audio description

Live audio description

Download symbols at www.nps.gov/hfc/carto/map-symbols.htm.